

PROCEEDINGS

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PUBLICATION NOTE

By a change in the By-Laws of the Biological Society of Washington, effective March 27, 1926, the fiscal year now begins in May, and the officers will henceforth hold office from May to May. This, however, will make no change in the volumes of the Proceedings, which will continue to coincide with the calendar year. In order to furnish desired information, the title page of the current volume and the list of newly elected officers and committees will hereafter be published soon after the annual election in May.

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DATES OF ISSUE

Papers from pages 1 through 94 were distributed on the date as printed on them. Through temporary lack of personnel pages 95 through 126 were distributed on December 8, 1944.

ERRATA

Page 106 in *Key to the Races of Maticora* No. 3 should read *i. intestinalis* and not *i. bilineata*.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

PROCEEDINGS.

The Society meets from October to May, on the second Saturday of each month at 8 P. M. All meetings during 1943 were held in Room 43 of the United States National Museum.

938th Meeting—January 8, 1944.

President Humphrey in the chair; 30 persons present.

New member elected: Mrs. Helen W. Williams.

A resolution opposing the construction of dams on the Potomac River near Washington was adopted.

Informal communications: Frank Thone, Exhibition of new books on biological subjects; H. B. Humphrey, Note on a northern specimen of walnut tree.

Formal communication: Herbert Friedmann, L. G. Henbest, Edward Kirk, and J. P. E. Morrison, Round-table discussion of evolution in light of recent literature.

939th Meeting—February 12, 1944.

President Humphrey in the chair.

Formal communication: H. L. Shantz, Some wild life inhabitants of our National Forests.

940th Meeting—March 11, 1944

President Humphrey in the chair; 48 persons present.

Informal communications: R. S. Bray, Exhibition of recent biological publications; J. S. Wade, Exhibition of recent biological publications; M. B. Waite, Note on the formation of atolls and glacial terraces; F. C. Lincoln, Note on game

law problems; J. W. Aldrich, Note on recent records of West Indian birds in Florida.

Formal communication: E. H. Walker, Plans for a cooperative survey of the flora of the District region.

941st Meeting—April 8, 1944

President Humphrey in the chair; 24 persons present.

Informal communications: J. W. Aldrich, Note on the equivalence of botanical ecotypes and zoological subspecies; H. B. Humphrey, Note on the observation of cowbirds at a feeding station; J. W. Aldrich, Note on a cowbird egg supposedly from Georgia in the National Museum; F. C. Lincoln, Note on the recent abundance of fox sparrows, and Note on the military use of homing pigeons; Frank Thone, Account of the recent Science Talent Search.

Formal communication: Miriam L. Bomhard, Palms: useful as well as ornamental.

942d Meeting—May 13, 1944

65TH ANNUAL MEETING

President Humphrey in the chair; 11 persons present.

New member elected: W. Drew Chick.

The reports of the Recording Secretary, Corresponding Secretary, and Treasurer were read.

The following officers were elected: President, Frank Thone; Vice Presidents, L. K. Couch, J. S. Wade, W. L. Schmitt, J. W. Aldrich; Recording Secretary, S. F. Blake; Corresponding Secretary, R. S. Bray; Treasurer, F. C. Lincoln; Members of the Council, I. N. Hoffman, J. E. Benedict, Jr., F. W. Poos, Malcolm Davis, J. A. Fowler.

943d Meeting—October 14, 1944

Vice-President Wade in the chair; 28 persons present.

New members elected: R. G. Fennah, R. L. Hoffman, W. E. Hoffmann, L. G. Ingles, G. B. Saunders.

Informal communications: Exhibition of new books by J. W. Aldrich, S. F. Blake, J. S. Wade, and A. Wetmore; M. B. Waite, Note of early fishing experiences in northern

Illinois; J. A. Fowler, Occurrence of the scarlet snake at Lanham; Edith R. Keleher, Another occurrence of the scarlet snake in the vicinity of Washington.

Formal communication: R. H. Fiedler, World Fisheries and food.

944th Meeting—November 11, 1944

President Thone in the chair; 26 persons present.

Formal communications: R. C. Smith, The National Roster, with reference to the biological sciences; W. Drew Chick, Jr., Biology of Shenandoah National Park; H. B. Humphrey, A Canadian note.

945th Meeting—December 9, 1944

President Thone in the chair; 25 persons present.

New member elected; Arnold Grobman.

The deaths of Lyster H. Dewey and W. S. Long were noted.

Informal communications: M. B. Waite, Note on a possible case of transmission of rabies by a fox-bite to a dog; Frank Thone, Exhibition of new biological publications; H. B. Humphrey, Exhibition of new biological publications.

Formal communications: F. C. Lincoln, Report on a recent biological trip through the western and southwestern states; W. A. Archer, Botanists abroad: a philosophy for the good neighbor.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

REMARKS ON THE GEKKONID GENERA
HOMOPHOLIS AND *PLATYPHOLIS* WITH
DESCRIPTION OF A NEW RACE.

BY ARTHUR LOVERIDGE.

Boulenger (1885, Cat. Liz. Brit. Mus., 1, p. 191), when describing *Homopholis*, overlooked the minute retractile claw on both thumb and first toe, a point which appears to have escaped notice.¹ He also overlooked the inconspicuous, but functional, preanal pores which are present in all six males of the type species, *wahlbergii*, in the Museum of Comparative Zoölogy. Perhaps the solitary example which he believed to be the male type, but which FitzSimons (1937, Ann. Transvaal Mus., 17, p. 264) has shown was not, is a female, in which sex the pores are lacking or represented only by faint depressions. Boulenger also speaks of a slight rudiment of web between the digits, an appearance apt to result from the state of preservation.

Again Boulenger (1890, Proc. Zool. Soc. London, p. 88), when describing *Platypholis*, overlooked the minute retractile claws (cf. Tornier, 1896, and Scortecci, 1929), and separated it from *Homopholis* on two characters. (1) The presence of preanal pores in the male, which as we have seen does not separate them. (2) The juxtaposed, instead of imbricating, scales or granules. However, shortly afterwards Boulenger (1896, Ann. Mag. Nat. Hist. (6), 17, p. 447) described a Malagasy gecko, *heterolepis*, whose dorsal lepidosis consisted of juxtaposed granules intermixed with tubercles. In all other respects it agreed so closely with

¹ Fortunately I was able to communicate these observations to Dr. V. FitzSimons in time for him to include them on a corrigenda slip in his recently (1943) published volume "The Lizards of South Africa."

Homopholis wahlbergii that he referred it to that genus, saying that it was more logical to enlarge the generic definition to include both types of scalation as such are found in *Hemidactylus*, *Stenodactylus*, etc.

Thus I can find no grounds for considering *Platypholis* a recognizable genus. I have also carefully considered the possibility of referring both it and *Homopholis* to the synonymy of the closely related *Geckolepis* (Grandidier, 1867) of Madagascar, for the brief description reads as if they were scarcely distinguishable. An examination of the several species of *Geckolepis* in the collection of the Museum of Comparative Zoology, however, makes such action appear unjustified.

Though Boulenger assumed that the gecko collected by Wahlberg came from Natal (Smith gave the type locality as "Kafferland eastward of Cape Colony."), Mr. V. FitzSimons writes me (September 24, 1943) that he knows of no Natal record and believes that the type came from Zululand where Wahlberg is known to have collected. The typical form is definitely known from Zululand, Mozambique, and the Transvaal; the northern specimens may be known as

***Homopholis wahlbergii arnoldi* subsp. nov.**

Type.—Museum of Comparative Zoology, No. 12,581, an adult ♂ from Mahalapsi River, Bechuanaland Protectorate, collected by F. Dally.

Paratypes.—Transvaal Museum, No. 1,537, from Mahalapsi River, Bechuanaland Protectorate; Tvl. Mus., No. 18,799 from Birchenough Bridge, Southern Rhodesia; Tvl. Mus., No. 4,768 from Bulawayo, Southern Rhodesia; also National Museum of Southern Rhodesia, Nos. C2.8/1.2 and 1.4–1.9, from Bulawayo; Hillside, Bulawayo; and World's View, Matopos, Southern Rhodesia.

Diagnosis.—

Lower surface white peppered with sharply defined black spots;
range: Bechuanaland and Southern Rhodesia.....*w. arnoldi*

Lower surface white, uniform or more rarely faintly infuscated
with brown; range: Transvaal and Mozambique south through
Zululand (not known from Natal).....*w. wahlbergii*

Description.—Internasal granules 2; nostril surrounded by 4–5 nasals and the first labial; upper and lower labials both 11–11; scansors (i. e. "adhesive lamellae") and transversely dilated scales beneath first toe 2+4, beneath fourth toe 11 or 12+5; preanal pores 2.

Coloration.—Above, pale gray flecked with black, an irregularly broad, black, longitudinal dorso-lateral line from behind eye towards base of tail where it breaks up and forms transverse bars; limbs spotted or finely barred with black. Below, pure white, peppered with sharply distinct black spots, each covering a scale.

Measurements.—Total length of type ♂, 156 (97+59) mm., but tail regenerated.

Remarks.—Named for Dr. G. Arnold, Director of the National Museum of Southern Rhodesia, who very kindly supplied me with information regarding the half-dozen specimens listed above as paratypes. Two of the oldest of these are so entirely faded as to show no color whatever, the belly spotting having been leached out in Dr. Arnold's opinion.

It may be that Bechuanaland specimens only should be regarded as *H. w. arnoldi* and Southern Rhodesia examples considered as intermediates for in one Bulawayo gecko (Tvl. Mus. 4768) the dark specks are confined to the sides of the belly according to Mr. V. FitzSimons who generously supplied me with data of the Transvaal Museum paratypes, which I have not seen. He writes: "The majority of specimens from Transvaal and Zululand are immaculate below, but odd ones from different localities have a few dusky or ill-defined specks below.

Apart from colour there is nothing in the above description which differs from that of the typical form with the possible exception of an *average* difference of 2 internasal granules, for there is only a single internasal granule in seven of the typical *wahlbergii* from Mozambique and the Transvaal in the collection of the Museum of Comparative Zoölogy, there are 2 internasal granules in an eighth individual from Louw's Creek, Transvaal.

All eight are uniformly white or faintly infuscated beneath; while Smith described the type of *wahlbergii* as "reddish white, more or less tinged with lilac-purple," Boulenger describes the *alleged* type from Natal as "whitish, with a few scattered brown dots."

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON FISHES IN THE ZOOLOGICAL MUSEUM
OF STANFORD UNIVERSITY. XVI. A NEW
SPECIES OF SAND-DIVER, WITH NOTES ON
SOME RARE GOBIOID FISHES.

BY ALBERT W. C. T. HERRE

During 1940 and 1941 I was collecting fishes in the Philippines, Malaya, India, and Hong Kong, and studying the fisheries of those regions. Many new species were obtained, and large additions were made to our knowledge of rare and obscure species. Descriptions of nearly all the new species have been published already, but a new and interesting sand-diver was discovered when the fishes collected at Singapore were studied.

The sand-divers are a small group of slender, trimly built reef fishes, with pointed snout, inhabiting the coral reefs of the tropical Indo-Pacific. They live on the coral sand banks, where they creep in and out under algae, hydroids, corals and rocks. When pursued they dive into the sand with apparently as much ease as if it were water. Their home is a burrow in the sand, to which they retreat after feeding, and where they spend much of the time. On extensive sand flats they may occur in abundance.

Parapercis longifilis Herre, new species.

Dorsal V-I-20; anal I-17; scales in the lateral line 60; scales from lateral line to dorsal origin 5, to anal origin 13, to middle of underside 16; predorsal scales 7. The scales are ctenoid, except on the head, breast, and between the ventrals back to the anus. The margins of the preopercle and opercle are smooth.

The depth is 5.68, the head 4, the truncate caudal 6 times in the length. The body is plump, elongate, with broad, pointed head and steeply inclined snout. The breadth of the head is 1.35 times in its own length. The eye is lateral, high up, 4.28 times in the head, the distance from the hind margin of the eye to the tip of the snout only slightly more than to the posterior end of the opercle; the snout is 3 times in the head; the interorbital is 1.5 times in the eye. The mouth is moderately oblique, the posterior angle of the maxillary beneath the anterior part of the eye. The teeth are typical of the genus, a pair of short, stout antero-lateral canines present.

The first dorsal is small, the fourth spine longest, 4.5 times in the head or 18 times in the length; the two dorsals are almost completely separated, only a basal strip of membrane remaining; by elevation the fifth spine, the spine of the second dorsal is moved, thus proving their connection. The spine of the second dorsal is half the length of the head. The first 8 rays of the second dorsal are all elongate, with filiform tips, the first ray 3.37, the second ray 3.18 times in the total length; the others are shorter although the fifth is about as long as the first; the remaining rays become of nearly uniform height, the penultimate 2.7 in the head or 10.8 in the length. The anal rays are all like the penultimate dorsal ray. The small pectorals and ventrals do not quite reach the anal fin, their lengths equal, 5.14 in the total length.

The color in alcohol is brown above, yellowish brown below, with 8 darker crossbands over the back and down to the lateral line; the first is on the nape, the second under the first dorsal, the rest under the second dorsal; a series of large black dots along the dorsal base, and in each crossband, arranged to suggest a V, above the lateral line; a large, rounded, dark brown spot below the lateral line between each pair of crossbars, alternating with dark brown vertical bars or small spots; a black spot on the upper and one on the lower part of the caudal base, connected by a narrow, outwardly curved black bar. The ventral membranes are dusky and the anal has a submarginal dusky band; both ventrals and anal were probably dark violet or violet-brown in life; the caudal is violaceous brown, with a broad dusky band on the lower two-thirds of the free end; the other fins are clear. A violet-brown band, with pale marginal stripes, extends from the eye to the upper lip. A dusky band curves behind the eye and then downward across the cheek; the preopercle and opercle with numerous rather large pale spots; all the head marks are faded and seen with difficulty.

I collected the type and only specimen, 108 mm. long, on the extensive sand flats at Siglap, Singapore. The upper half of its body resembles Day's figure of *Parapercis punctata*, but it is evidently not that species and is unlike any thus far described.

ASTERROPTERYX ENSIFER (Bleeker).

Brachyeleotris ensifera Bleeker, Versl. Akad. Amsterd., vol. VIII, p. 375, 1874.

M. Weber, Fische, Siboga Expedit., p. 454, 1913.

Four specimens of this rare little eleotrid were collected from a coral head, in a lagoon within a group of islets several miles west of the town of Jolo; 3 are females, 15 to 18 mm. in length, and a male is 17 mm. long.

Dr. Bleeker had but a single specimen, 29 mm. long, from the island of Buru. Dr. Weber obtained 3 examples, 27 to 35 mm. in length, from Sarassa, in the Postillon Islands, which lie between the Sunda and Flores Seas, north of Sumbawa and southwest of Celebes. They were taken from coral bottom, at a depth of 35 meters.

Dorsal VI-1-10; anal I-9 or 10; scales in a longitudinal series 24 (22 also?), deciduous; transverse series 8; predorsal scales 5, the anterior one extending between the posterior part of the eyes; the head and trunk are covered with ctenoid scales.

The form and proportions are much like those of *Asterropteryx semipunctatus*, from which it is strongly differentiated by the presence of a spur at the angle of the preopercle, instead of the 3 to 6 stout teeth or spines of the common species. This spur extends from a third to almost entirely across the opercle. The head of my largest specimen is 2.6, the caudal 3 times in the length. The long, pointed pectoral equals the head and extends to a point well over the anal fin; the pointed ventral is a little shorter, reaching the anal origin or beyond; the third dorsal spine is more or less threadlike, extending well upon the second dorsal when depressed.

Preserved specimens are brown, with 3 wide and much darker cross-bands; each scale is marked by one or two small, pearly, circular spots or dots, evidently blue in life; the dorsals are blackish brown, or the upper margin of the first dorsal may be clear; the anal may be dark brown to nearly clear; the caudal is more or less brown, the other fins clear.

Gladiogobius ensifer Herre, with which *Asterropteryx ensifer* might be confused, is well distinguished; it is a true goby, with ventrals always united basally, and with a thin, delicate membrane extending for a third or half their length. The head and nape are entirely naked. *Asterropteryx ensifer* is a true eleotrid, with the ventrals well separated and without a trace of a connecting membrane. The head and nape are covered with ctenoid scales.

ILLANA BICIRRHOSA (M. Weber).

Five specimens, 50 to 68 mm. in length, were collected in a nipa swamp at Capiz, Panay, and 2, of 62 and 70 mm., were taken at Dumaguete. Only known heretofore in the Philippines from the Rio Grande at Cotabato, Mindanao, and supposed to be very rare. Search in nipa and mangrove swamps will doubtless show it to be fairly common. It looks so much like a *Glossogobius*, as Koumans has stated, that it has doubtless

been mistaken for *G. celebius* or *G. giurus*. Known elsewhere from Celebes and Java.

PANDAKA PUSILLA Herre.

Fifty-four specimens, 9.4 to 14 mm. in length, were collected in a mangrove swamp near Coron, Busuanga; 39 examples, 10 to 14 mm. in length, were taken from a nipa swamp near Capiz, Panay. This dwarf goby has been known hitherto only from Sitankai, Sulu Province, where it is common on the tidal flats.

VAIMOSA BALTEATA Herre

Vaimosa balteata Herre, Zoolog. Series Field Mus. Nat. Hist., vol. XVIII, p. 419, 1935.

Vaimosa balteata Herre, Zool. Ser., Field Mus. Nat. Hist., vol. XXI, fig. 21, p. 359, 1936.

One specimen, 13 mm. long, of this rare goby was taken from a pool near the Fisheries Station, Zamboanga, P. I. It has been known previously from the type, 19.5 mm. long, and a damaged specimen of 20 mm., both taken from a creek flowing into Majalibit Inlet, Waigiu Island.

This boldly marked little fish is a noteworthy addition to the Philippine fauna. The figure cited above gives an excellent idea of its characteristic appearance. It is recognized at a glance by the broad black band from the top of the dorsal down to the belly and the black bar from the eye to the lower end of the pectoral base.

SICYOPUS ZOSTEROPHORUM Bleeker.

Sicydium zosterophorum Bleeker, Nat. Tijds. Ned. Ind., vol. XII, p. 296, 1856-7.

Sicyopus zosterophorum Gill, Proc. Acad. Nat. Sci. Phila., p. 262, 1863.

Bleeker, Versl. Akad. Amst., 2 ser. vol. IX, p. 287, 1876.

De Beaufort, Bijdr. Nederl. Dierk. Ver. Amsterdam, p. 145, plate II, fig. 5, 1913.

Dorsal VI-1-9; anal I-9-10; scales in lateral series 32, in transverse 8; predorsal scales 5 or 6 on females, but absent on males.

A male 39 mm. long has the depth 5.3 in the length; the head and the broadly rounded caudal are equal, 3.5 times in the length; the eye is 5, the snout 3.1 times in the head; the interorbital is 1.3 times in the eye. The broad pectoral is 4.8 times in the length; the vertical fins are low, the first dorsal 2.2 times in the head or 7.8 times in the length; the last anal and dorsal rays are longest, extending on the caudal when depressed, the anal 6.5, the dorsal 5.5 in the length; the ventral is broader than long, its length 1.8 in the head or 6.5 times in the standard length. The least depth of the caudal peduncle equals its length, 2.2 times in the head.

A gravid female 28 mm. long has the depth 4.66, the head and caudal 3.6, the pectoral 4.3 times in the length. The eye is 4.5, the snout 3.75

times in the head, the interorbital 2.8 times in the eye. The fins are all very low, the last dorsal and anal rays falling far short of reaching the caudal when depressed, 9 times in the length; the breadth of the ventral equals its length. Another female, 36 mm. long and not in breeding condition, has the depth 6.5, the head and caudal 3.6, the pectoral 4.8 times in the length; the ventral is perceptibly broader than long.

The body is low, elongate, the upper and lower profiles nearly horizontal, the back very little elevated, the broad head little depressed, the wide, blunt snout convex; the width of the head is a little more or less than 1.4 times, its height about twice, its own length. The mouth is large, with wide fleshy lips, the angle of the maxillary under the middle or posterior part of the eye; in the largest male it is under the hind margin of the eye, or a trifle more posteriorly.

The head is naked, and the under side of the body is naked back to the anus. The conical, pointed anal papilla of males equals the eye; that of females is short, expanded and slightly notched at the tip, becoming much thicker at spawning time.

The sexes are markedly different in coloration. In life, males are more or less dusky blue or violet on the front half of the body, or with wide dark blue bands anteriorly, while the posterior half, including the dorsal and anal fins, is brilliant carmine, with 3 narrow dusky blue or violet crossbands. In alcohol, a violaceous dusky band covers the head, and another enfolds the body from the origin of the first dorsal to that of the second dorsal; the rest of the body is pale tan, with 2 narrow dusky cross stripes below the second dorsal, and a third and wider one on the caudal peduncle; each scale on the body has a marginal vertical lunate dusky bar. The first dorsal fin is dusky blue or violet in life, with a narrow band of carmine along its upper margin and a violet marginal line; in alcohol it is dusky, the red band disappearing and leaving a clear stripe. The red vanishes from the second dorsal and anal, and they become clear with a marginal dark line. The other fins are colorless or nearly so.

Females are yellowish in alcohol, each scale with a vertical lunate marginal brown or violet-brown bar; on the back are 4 rather faint dusky crossbands; the first is before and under the first dorsal; the second is before the second dorsal; the third is under the middle of the second dorsal and is more or less divided; the fourth is on the caudal peduncle; a fifth may be present on the caudal base; the top of the head and snout are violaceous dusky. The fins are all clear.

Eight specimens were taken from a small creek in the hills at San Ramon Penal Colony, Zamboanga Province, Mindanao. Five females are from 28 to 36 mm. in length, the two smallest, 28 and 29 mm. in length, being filled with eggs and nearly ready to spawn. The eggs are very tiny and numerous. Three males in full nuptial coloration are 29 to 39 mm. in length. These fish live under stones and gravel in the pools and rapids of hill streams. Numerous specimens were seen in the

Pasonanca River several miles from the town of Zamboanga, but none were caught.

Previously known from a male 51 mm. long (the caudal fin probably included in this length), taken in Bali in 1855, and 2 males 38 and 45 mm. in length, collected by Dr. L. F. de Beaufort in 1910 from the Eme River, Ceram.

Undoubtedly this fish occurs in many places throughout Mindanao and the East Indies. Its habits and mode of life are like those of *Stiphodon elegans*, and like that widely distributed fish it is difficult to secure; even where the fish are easily seen, usually they cannot be caught by nets. When poisoned, they do not try to leave the water, as many fishes do, but burrow under rocks and into crevices and are rarely found.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW FORM OF MYIOBORUS FROM NORTHERN
SOUTH AMERICA.

BY ALEXANDER WETMORE AND WILLIAM H. PHELPS.

Examination of considerable series of specimens has indicated to the authors, working independently, that there are two races of *Myioborus miniatus* in the range currently accepted for *M. m. pallidiventris* (Chapman). The one here separated may be known as

Myioborus miniatus ballux subsp. nov.

Characters.—Similar to *Myioborus miniatus verticalis* (Lafresnaye and d'Orbigny)¹ but with white on outer rectrices definitely less extensive.

Similar to *Myioborus miniatus pallidiventris* (Chapman)² but color below deeper, more orange, especially on the breast.

Similar also to *Myioborus miniatus aurantiacus* (Baird)³ but paler yellow below; white on outer rectrices more extensive.

Description.—Type, Coll. W. H. Phelps no. 9263, ♂, gonads slightly enlarged, from 1600 meters elevation near Queniquea, Táchira, Venezuela, collected November 7, 1940, by F. Benedetti. (Type on deposit in the United States National Museum).

Posterior part of pileum in center Kaiser brown with an overlying wash of chestnut; feathers of forepart of crown dull black centrally, margined with slate color, producing a spotted appearance; a narrow border of dull black on either side of brown crown patch; loreal region dull black, this color extending over malar area and the lower eyelid; sides of head, including space above eye, and dorsal surface between deep and dark neutral gray; upper tail-coverts dull black; wing-coverts dark neutral gray; remiges dusky neutral gray; rectrices dull black, the outer pair white almost to the under tail-coverts, the next pair with a slightly larger area of basal black, the third pair with half the outer web white with a

¹ *Setophaga verticalis* Lafresnaye and d'Orbigny, Syn. Av., Mag. Zool., vol. 7, 1837, p. 50, cl. 2, pls. 77 to 79 (Ayupaya, Bolivia).

² *Setophaga verticalis pallidiventris* Chapman, Bull. Amer. Mus. Nat. Hist., vol. 12, August 5, 1899, p. 153 (Quebrada Seca, Sucre, Venezuela).

³ *Setophaga aurantiaca* Baird, Rev. Amer. Birds, vol. 1, May, 1865, p. 261 (Dota Mountains, southern Costa Rica).

narrow blackish external border reaching past the level of the white on the inner web and the inner part of the inner web white for the distal fourth, the fourth pair with a faint linear spot of white at the tip of the outer web; sides of throat deep neutral gray; center of throat dull black, with a slight overwash of deep neutral gray; breast and abdomen between light cadmium and aniline yellow; a wash of dark primuline yellow on upper breast, forming an indefinite spot; under wing-coverts mixed whitish and neutral gray; under tail-coverts white. Maxilla blackish; mandible, tarsus and feet aniline black (from dried skin).

Measurements.—Males, 34 specimens, wing 62.6–69.5 (65.9), tail⁴ 60.2–67.2 (63.0), culmen from base⁴ 11.5–13.3 (12.3), tarsus 17.0–19.2 (18.2) mm.

Females, 17 specimens, wing 58.7–63.6 (61.4), tail 56.7–62.0 (59.4), culmen from base⁵ 11.0–12.7 (12.0), tarsus 17.0–18.3 (17.7) mm.

Type, male, 65.2, tail 60.2, culmen from base 11.7, tarsus 18.4 mm.

Range.—The lower part of the Upper Tropical Zone, and the higher portions of the Lower Tropical Zone of western Venezuela through the mountains of southeastern Lara (Cubiro), Trujillo (El Rincón in the Cerro Niquitáz, Altamira, Páramo Misisi), Barinas (1300 meters above Altamira), Mérida (Mérida, Escorial, La Culata, La Hechiza, Timotes, Quintero, El Valle), and Táchira (Bramón, Queniquea, Seboruco, and Las Delicias and Villa Paez below the Páramo de Tamá), also on Mount Roraima, Bolívar, Mount Duida,⁶ Amazonas and Mount Twék-quay, British Guiana; the whole of Colombia (except the Sierra Nevada de Santa Marta) from the Sierra Perijá, (Tierra Nueva, Monte Elias, La Africa, Laguna de Junco and Eroca) and Atlántico (Los Pendales) southward through Ecuador. Also on Mt. Pirri, in southeastern Darién, Panamá.

Remarks.—Four males and one female in the Phelps collection from Arabupu on Mt. Roraima seem very faintly darker but otherwise are identical with typical *ballux*, especially in the deep, rich color below. The dark race seemingly extends widely through the highlands of Bolívar and Amazonas. The birds in the U. S. National Museum secured by E. A. Goldman on Mt. Pirri above the Río Tuira in the highlands of southeastern Darién are placed here provisionally, as the series of four males and five females seen agree with *ballux* in color. They show some tendency toward greater restriction of the white on the outer rectrix, in this indicating slight approach to *aurantiacus* of western Panamá, and also have the tail averaging a very little smaller, in males this being 54.8 and in females 57.2 mm.

A series from the Sierra de Perijá in Colombia, including specimens from Tierra Nueva and Monte Elias at the northern end of the range, La Africa, Laguna de Junco and above Eroca near the central part of the range, in the Departamento Magdalena, and from Convención at the south in the Departamento Norte de Santander are definitely inter-

⁴ 33 specimens.

⁵ 16 specimens.

⁶ See Chapman, Bull. Amer. Mus. Nat. Hist., vol. 63, 1931, pp. 114–116.

mediate between *pallidiventris*, as represented by birds from the Sierra Nevada de Santa Marta, and *ballux*, but are nearer the latter.

While the range as here given includes Ecuador, birds of the western part of that country are probably separable on the basis of restricted black on the head.⁷

We have available an excellent series of *M. m. pallidiventris* (Chapman) which, as here restricted, ranges through the mountains of northern Venezuela from Sucre, the highlands of Falcón, to Cerro El Cerrón in northern Lara, north of the Cordillera de los Andes which is inhabited by the new form. We have examined specimens from Venezuela from the following localities. Sucre (Quebrada Seca the type locality, Montaña del Guacharo, and Los Palmares), Anzoátegui (Quebrada Bonita and Cerro El Peonía near Bergantín), Miranda (Mariches, Pico Nai-guatá and Hacienda Izcaragua), Distrito Federal (San José de Los Caracas, El Junquito, Cumbre La Culebrilla on El Avila, and Junquito Road), Aragua (Colonia Továr, Cerro Golfo Triste near San Casimiro, Rancho Grande), Carabobo (Las Quiguas, Chirgua), Falcon (San Luis), Lara (Quebrada Arriba and Cerro El Cerrón, near Carora.)

Measurements of *pallidiventris* from Venezuela are as follows:

Males, 20 specimens, wing 58.8–68.8 (63.4), tail 57.4–63.1 (60.7), culmen from base 11.4–12.5 (12.1), tarsus 17.0–18.8 (18.0) mm.

Females, 14 specimens, wing 57.4–65.9 (61.0), tail 54.8–63.4 (59.3), culmen from base 11.0–12.5 (12.0), tarsus 16.8–18.5 (17.7) mm.

The birds of the Sierra Nevada de Santa Marta, Colombia in series are faintly different from birds of eastern Venezuela in very slightly higher gray above, and faintly paler yellow on the posterior lower parts. On the average they have less orange on the upper breast. They are so close, however, that we have allocated them to *pallidiventris*.

There are in *pallidiventris* therefore three distinct population groups, one in Colombia, in the Sierra Nevada, and two in Venezuela, viz., in the Cordillera de la Costa with its outlying ranges to the west, and in the less elevated, isolated mountains of Sucre, Anzoátegui and Monagas in the northeast.

⁷ See Chapman, Bull. Amer. Mus. Nat. Hist., vol. 55, 1926, p. 597.

PROCEEDINGS
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A REVIEW OF THE FORMS OF COLINUS
LEUCOPOGON (LESSON).

BY HERBERT FRIEDMANN¹

The latest revision of *Colinus* is that of Hellmayr and Conover (Cat. Birds Amer., pt. 1, no. 1, 1942, pp. 238-259). Their treatment of the forms *hypoleucus*, *leucopogon*, *sclateri*, and *dickeyi* is not at all in accord with material I have studied (much of it, indeed, borrowed from Conover's collection and from the Chicago Natural History Museum). In the first place, they put all these forms in the species *C. cristatus*, while it seems to me much better to follow the older arrangement, adopted by Peters (Check List Birds of World, vol. 2, 1934, p. 50), of considering them as a species *C. leucopogon*. Aside from all this, however, study of good material clearly shows that the subspecies *hypoleucus* and *sclateri* as considered by Hellmayr and Conover and by other recent authors, are each actually composites of two distinct races. In the case of *sclateri* there is a name, *leylandi*, fortunately available for the "split"; in the case of *hypoleucus* no name has previously been proposed, so it becomes necessary to formally introduce one in this paper.

The forms of *Colinus leucopogon* (Lesson) are as follows:

1. *Colinus leucopogon leucopogon* (Lesson): characterized, in the male by the restriction of the white to the forehead, broad superciliaries, chin, and throat; occurs in El Salvador, east of the Rio Lempa, in the Arid Lower Tropical Zone grasslands, pastures, and cornfields. According to van Rossem this form may intergrade with *C. l. sclateri* in parts of southern Honduras and western Nicaragua, but so far no proof is forthcoming.

2. *Colinus leucopogon hypoleucus* (Gould): characterized in the male, by very extensive but variable amounts of white on the plumage, occasionally involving practically the entire underparts other than the

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flanks, thighs, and undertail coverts; occurs in El Salvador west of the Rio Lempa in country of similar sort to that occupied by the nominate race, but also up to as high as 5000 feet on the slopes of the volcanoes of San Salvador and Santa Ana. This form has hitherto been considered as ranging from western El Salvador into adjacent parts of Guatemala, but this I find is not so, the Guatemalan birds being very distinct. They may be known as

3. *Colinus leucopogon incanus*, subsp. nov.

Type: Chicago Natural History Museum No. 93555, ad. ♀, collected at Saloma, Baja Vera Paz, Guatemala, by E. R. Blake, April 24, 1934.

Subspecific characters: similar to *C. l. hypoleucus* but paler, especially above; the general color of the upperparts of the female being pale buckthorn brown with a grayish tinge (as against snuff brown with a grayish tinge in *hypoleucus*); the male of *incanus* with the scapulars and upper wing coverts only slightly suffused with rufescent (deeply suffused in *hypoleucus*). A female has been chosen as the type because of the well known variability of the male in this group of white-breasted quail.

Range: southern Guatemala from the Upper Motagua Valley to the Departments of Jalapa and Baja Vera Paz.

Material seen of *C. l. incanus* 3 ♂, 4 ♀.

4. *Colinus leucopogon leylandi* (Moore); characterized in the male, by brownish black throat surrounded by a white border; superciliary and malar stripes white; in the female by the pale slightly buffy throat; very similar to the female of *C. l. hypoleucus*, but the breast slightly more rufescent; occurs in Plateau region Honduras (Department of Tegucigalpa).

5. *Colinus leucopogon sclateri* (Bonaparte): characterized, in the male, by general similarity to that of *C. l. leylandi* but with the superciliary and malar stripes strongly washed with buffy, and the breast and abdomen more rufescent; the female like that of *leylandi* but with the throat deeper buffy; occurs in the Pacific slope of Nicaragua.

6. *Colinus leucopogon dickeyi* Conover: characterized, in the male, by general similarity to *C. l. sclateri* but readily distinguished by the fact that it has the feathers of the chin and throat white basally and centrally; the female not certainly distinguishable from that of *C. l. sclateri* in coloration; occurs in the Plateau region and Pacific slope of Costa Rica.

For permission to describe the new form based on specimens in the Chicago Natural History Museum and for the loan of other material used in the present study, I am indebted to the authorities of that Museum (Dr. Karl P. Schmidt) and to Mr. H. B. Conover.

PROCEEDINGS
OF THE
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FERN MISCELLANY—VI.¹

BY WILLIAM R. MAXON.

There are offered herewith a few additional notes on tropical American ferns, in continuation of a series of short papers begun in 1930.²

SCHIZAEACEAE

Anemia flexuosa (Sav.) Swartz

This species, widely distributed in South America, was founded upon a specimen (Paris Herbarium) collected by Dombey, of which an excellent photograph by Mrs. Una F. Weatherby is at hand. Agreeing closely are British Honduras specimens received from the University of Michigan several years ago but until now not identified; they were collected on "Mountain Pine Ridge," El Cayo District, March 3, 1931, by H. H. Bartlett (no. 11898), and are apparently the first record for North America. The disjunct range now to be ascribed this species is unusual but by no means unique.

POLYPODIACEAE

Polytaenium lineatum (Swartz) J. Sm.

To this common tropical American species, known also as *Antrophyum lineatum* (Swartz) Kaulf., must be referred *Vittaria intramarginalis* Baker,³ as a reduced form in which commonly there is only a single sporangial groove at either side of the costa. Large well-developed plants of *P. lineatum* have as many as four sporangial grooves at either side; but the number decreases in smaller and less vigorous plants, and in this respect there is a complete transition to the single pair characteristic of so-called *V. intramarginalis*. Occasional specimens show, arising from the same rhizome, fronds having a single pair and others having two pairs of sporangial lines. Substantiating data are noted also in the rhizome scales of "*intramarginalis*," which are clearly those of *Polytaenium*, and in the entire absence of paraphyses among the sporangia.

¹ Published by permission of the Secretary of the Smithsonian Institution.

² The earlier papers are: Proc. Biol. Soc. Washington 43: 81-88, 1930; 46: 105-108, 1933; 46: 130-146, 1933; 51: 33-40, 1938; 52: 113-120, 1939.

³ Journ. Bot. Brit. & For. 15: 266, 1877.

The type of *V. intramarginalis*, from Jamaica (*Jenman* 58), has been examined by the writer at Kew. Agreeing with it are numerous specimens from Cuba and a smaller number from Puerto Rico, Hispaniola, and Panama.

Elaphoglossum Herminieri (Bory & Fée) Moore, Ind. Fil. xvi. 1857.

Acrostichum Herminieri Bory & Fée, Mém. Foug. 2: 43. pl. 11. 1845.

Acrostichum longissimum Sod. Sert. Fl. Ecuad. 3. 1905.

Elaphoglossum longissimum C. Chr. Ind. Fil. 310. 1905.

As *Elaphoglossum Herminieri*, this species has been known from all the Greater Antilles, Martinique, Guadeloupe, and Trinidad, and on the continent from Guatemala to northern South America. It was not reported from Ecuador by Sodiro.⁴ That it occurs in Ecuador is evident, however, from an examination of presumably type material of *Acrostichum longissimum* Sod., from lowland tropical forest along the Rio Santiago, Province of Esmeraldas, which accords perfectly with Sodiro's description and with typical specimens of *Elaphoglossum Herminieri* from other regions.

Polypodium Lehmannianum Hieron. Bot. Jahrb. Engler 34: 513. 1904.

Polypodium sublongipes Christ, Bull. Soc. Bot. Genève II. 1: 218. 1909.

The type collection of *P. Lehmannianum* is from the Cordillera de Pasto, Colombia, *Lehmann* 19, a specimen of which is in the National Herbarium. Hieronymus cites also an Ecuador collection (*Strübel* 1011), and the following additional specimens may be listed, extending the range far northward.

GUATEMALA: Near Finca Sepacuité, Alta Verapaz, alt. 1050 meters, *Cook & Griggs* 385. Quebradas Secas, Alta Verapaz, alt. 750 meters, *H. Johnson* 855. Finca Seamay, Senahú, Alta Verapaz, *Hatch & Wilson* 206a.

COSTA RICA: Near Pejivalle, Prov. Cartago, alt. 900 meters *Standley & Valerio* 46999. Buena Vista, on road to San Carlos Valley, alt. 600 meters, *Cook & Doyle* 141.

PANAMA: El Boquete, alt. 1000 meters, *Maxon* 5059.

ECUADOR: Near Puyo, Prov. Napo-Pastaza, alt. 360 meters, *Meria* 6922.

This species is related to *P. arcuatum* Moritz, from which it is well distinguished by Hieronymus.

Polypodium sublongipes Christ, described from Costa Rica, is apparently the same. It was founded on fairly ample material collected by Wercklé in 1904, of which only a single broken frond (lacking the rhizome) is preserved in the Paris Herbarium. This, which was received on loan several years ago, seems to differ in no respect from the *Lehmann* type.

⁴ Crypt. Vasc. Quit. 1893.

Polypodium ursipes Moritz ex Kuhn, *Linnaea* 36: 135. 1869, as syn.; C. Chr. Ind. Fil. 572. 1906.

Polypodium ambiguum Mett. ex Kuhn, *Linnaea* 36: 134. 1869; not Desv. (1827) nor Blume (1828).

Founded on specimens from Tovar, Venezuela, collected by Fendler (no. 254) and Moritz, and apparently known till now only from Venezuela. The Fendler plant has been examined at Kew. Agreeing rather closely with it in essential characters, and showing only very rarely a casual anastomosis of the outer veinlets, are the specimens listed below. The Moritz element has not been seen.

COSTA RICA: Forests of Achiote, Volcán Poás, alt. 2200 meters, *Pittier* 10725. Volcán Turrialba, alt. 2000–2400 meters and upward, *Torres* 160; *Standley* 35136, 35140, 35211. Volcán Barba, alt. 3000 meters, *M. Valerio* 224. Guayábillos, Prov. San José, alt. 2160–2180 meters *Dodge & Thomas* 4938. Tablazo, alt. 1800–1900 meters, *M. Valerio* 271, II. 29. Vara Blanca de Sarapiquí, between Poás and Barba volcanoes, alt. 1890 meters, *Skutch* 3380.

Of these specimens, *Skutch* 3380, a single frond, is the best and largest. It is 85 cm. long—the stipe 30 cm. long, the blade 55 cm. long and 18 cm. broad. Most of the other specimens are about half as large.

This species is an epiphyte. The relationship with *P. puberulum* Schlecht. & Cham., suggested by Mettenius, is not very close.

Diplazium cristatum (Desrouss.) Alston

The synonymy of this common tropical American species, which was long known as *Diplazium Shepherdii* (Spreng.) Link and later very generally as *D. arboreum* (Willd.) Presl, has been stated by Alston,⁵ who examined the type specimen of *Meniscium cristatum* Desrouss., from Martinique, in the Lamarck Herbarium.

Here may now be referred also *Asplenium flexuosum* Wikstr.,⁶ listed by Christensen as a doubtful species. It was described from Guadeloupe material collected by Forsström, and is represented at Stockholm by three specimens. These were examined by the writer in 1928. Two of them are annotated *A. flexuosum* by Wikström, and all three represent the typical form of the species. Their agreement with the Willdenow type of *A. arboreum* is especially close.

Dryopteris longicaulis (Baker) C. Chr.

This species, described and illustrated upon Antioquia material collected by Kalbreyer (no. 1454), has been re-collected in Colombia by Killip (no. 7950), the specimens being from the Micay Valley, Department of El Cauca, altitude 2000 to 2200 meters.

It occurs also in Ecuador, as shown by an isotype specimen of *Dryopteris vaccanea* Bosco (Nuov. Giorn. Bot. Ital. n. s. 45: 144. 1938), which is identical. This is from Plan de Sapote, altitude 2100 meters, *Crespi* 29.

⁵ Journ. Bot. Brit. & For. 74: 173. 1936.

⁶ Vet. Akad. Handl. Stockholm 1825: 438. 1826.

Dryopteris pusilla (Mett.) Kuntze

In addition to the wider range previously stated,⁷ this species may now be reported from Ecuador on the basis of material collected at Plan de Sapote, alt. 2100 meters, by Father C. Crespi, and described, strangely enough, as *Polypodium induens* Maxon var. *subdentatum* Bosco (Nuov. Giorn. Bot. Ital. n. s. 45: 149. 1938). The isotype specimen at hand bears no resemblance to *P. induens*, but in its pendent habit and in the cutting of its soft, light green fronds it is definitely suggestive of *Polypodium senile* Fée and related species. The indusium, though small, is evident.

Dryopteris praetermissa Maxon, sp. nov.

§*Goniopteris*. Rhizoma suberectum, 2-3 cm. diam., fortasse 10 cm. longum, apice dense palaceum, paleis fusco-cinnamomeis, subulato-attenuatis, 5-7 mm. longis, 1-1.5 mm. latis, dense et minutissime puberulis, pilis simplicibus vel apice substellatis (radiis 2 vel 3). Folia pluria, usque ad 1.2 m. longa, suberecta; stipites validi, laminas aequantes, olivacei, alte sulcati, pilis apice multiradiatis minutis tenuiter puberuli; laminae latissime oblongae, usque ad 55 cm. longae et 50 cm. latae, pinnato-pinnatifidae; pinnae 8-12-jugae cum impari, patentes, subaequales, pleraeque suboppositae, lineares vel anguste lanceolatae, 20-25 cm. longae, 2-3 cm. latae, apice longe attenuatae, petiolulatae (2-5 mm.), basales basi abrupte sinuato-cuneatae, mediales basi superiore curvato-excavatae, omnes ad medium vel paululum ultra aequaliter pinnatifidae; segmenta oblonga, subfalcata, obtusa vel antice acutiuscula, prope sinum 4-6 mm. lata, margine leviter callosio pilis simplicibus antrorse ciliolata; venae tenues, prominulae, 10-16-jugae, simplices, pleraeque curvatae, basales 3 vel 4 utrinque ad sinus membranam pellucidam egredientes, infima posteriore saepe e costa oriens; costae subtus hirtellae, pilis plerisque capitato-stellatis (radiis 2-6, brevibus, patentibus vel recurvatis), costulae et venae pilis similibus sed minoribus instructae, parenchymate glabro; sori 10-15-jugi, inframediales, crebres, exindusiati; sporangia numerosissima, pilis furcatis vel apice stellatis dense instructa.

Type in herbarium of the University of Michigan, collected in jungle "beyond the Little Mountain Pine Ridge," El Cayo District, British Honduras, May 8, 1931, by H. H. Bartlett (no. 13104); fragments and photograph of type in U. S. National Herbarium. Other material is as follows:

HONDURAS: San Pedro Sula, Dept. Santa Barbara, Thieme (J. D. Smith 5693). Mountains near Puerto Sierra, Jan. 24, 1903, P. Wilson 163, 166. Lancetilla Valley, near Tela, Dept. Atlántida, alt. 20-600 meters, Standley 52711, 52895.

BRITISH HONDURAS: Little Mountain Pine Ridge, March 1, 1931, Bartlett 11878.

As "var. 6" of *Dryopteris tetragona* the present form was discussed briefly by Christensen (Mon., p. 263) as probably representing a new species, which, however, could scarcely be described from the fragmen-

⁷ Proc. Biol. Soc. Washington 43: 87. 1930.

tary material then available, i.e., J. D. Smith's no. 5693. Subsequently (1921) Miss Margaret Slosson prepared a manuscript description, which was never published; but Mr. Wilson's Honduras material (herb. New York Botanical Garden) upon which it was based is smaller and otherwise less satisfactory than the specimen above selected as type. In any event a different specific epithet is required, the one chosen by Miss Slosson being a homonym of *D. Wilsoni* (Baker) C. Chr. (1905).

Dryopteris praetermissa belongs to the small group of species allied to *D. tristis* (Kunze) Kuntze, from all of which it differs among other characters in having the sporangia densely beset with furcate or many-branched setae, rather than glabrous. It varies considerably in venation. The type specimen is exactly matched by *Wilson* 166, in which the basal veins (usually 3 pairs) are arcuate and run obliquely to a translucent sinus membrane; but in *Wilson* 163 the first pair of veins often come together almost horizontally, not far from the costa, and connect with a veinlike inward extension of the sinus membrane. The normal range of variation in this respect can scarcely be determined from the specimens at hand.

***Maxonia apiifolia* (Swartz) C. Chr.**

The present species, known previously from Jamaica and Cuba, and on the continent from Guatemala and Panama, has recently been collected in Ecuador, a very considerable extension of range. The specimens are from the vicinity of Quinde, altitude 50 to 150 meters, April 8-13, 1943, *L. R. Holdridge* 1640. Sufficient material for general distribution was obtained.

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NOTES ON THE STELLER JAYS (*Cyanocitta stelleri*)
OF SOUTHERN MEXICO.

BY JOHN W. ALDRICH.

The Steller jays of southern Mexico seem to need some revision, both with regard to the application of names already proposed, and also the naming of undescribed races. A recent study of the specimens in the U. S. National Museum, including those in the extensive Nelson-Goldman Mexican collection, of the U. S. Fish and Wildlife Service, showed at once the existence of considerable geographical variation on the southern portion of the Mexican tableland.

There is a fairly consistently black-headed population in the vicinity of Mexico City (Mount Popocatepetle; Tetela del Volcan, Morelos; Volcan Toluca; Mt. Ixtaccihuatl; Ajusco; and Tochimilco, Puebla); a blue-headed race occurs in the mountains to the south (Sierra Madre del Sur, of Guerrero and Oaxaca), and as far north as Orizaba. North of Orizaba in Vera Cruz (Mirador and Cofre de Perote) is an intermediate population represented by specimens of both blue and black-headed individuals, with all sorts of intergrades, but they seem to average definitely nearer the blue-headed race.

The type of *coronata* is not in existence, but the original description by Swainson (Philos. Mag., (n.s.)1, 1827:437) indicates a blue-crested bird taken by Bullock on the table-land of Mexico. This seems to place it somewhere in the mountainous regions south or southeast of Mexico City, very likely along the route taken by William Bullock while making the round-trip between Vera Cruz and Mexico City, described in his "Six Months Travels in Mexico". Dr. W. B. Davis, in his manuscript on a collection of birds from eastern Mexico, has described the geographic variation of these jays in the states of Vera Cruz and Mexico. He has chosen Cofre de Perote, Vera Cruz, as the restricted type locality of *coronata*, a course in which I believe he is justified.

Specimens from Chiapas are lighter and more uniform bluish than the series from Cofre de Perote and Mount Orizaba taken as typical of *coronata*, and are referred to *ridgwayi* Miller and Griscom. Specimens from Michoacan are deeper colored, more purplish on breast, back, and

crest than "*azteca*" from the high mountains in the vicinity of Mexico City, and very much darker and more purplish than *coronata*. They seem to represent a recognizable race which may be called:

***Cyanocitta stelleri purpurea*, new subspecies.**

MICHOACAN STELLAR JAY

Type.—No. 185115, U. S. National Museum (Biological Surveys collection); Patamban, Michoacan, Mexico; January 30, 1903; E. W. Nelson and E. A. Goldman; original number, 9025.

Subspecific characters.—Similar to *C. s. coronata* of southern and eastern Mexico, but darker and richer (more purplish) blue, both above and below; throat more blackish. Similar also to *C. s. "azteca"* from the high mountains in the vicinity of Mexico City, but deeper and more purplish blue throughout; crest and throat more bluish, less blackish. Intermediate in size between "*azteca*" and *coronata*.

Measurements.—Adult male (5 specimens from Michoacan): wing, 139.5–150.0 (145.3) mm.; tail, 142.0–149.0 (145.8); exposed culmen, 25.0–27.5 (26.4); tarsus, 42.0–43.5 (42.3); middle toe without claw, 22.0–24.5 (23.3). Adult female (3 specimens from Michoacan): wing, 136.0–144.5 (140.8); tail, 133.0–140.5 (137.5); exposed culmen, 24.5–27.5 (26.0); tarsus, 40.5–42.0 (41.3); middle toe without claw, 23.0–24.0 (23.5).

Range.—As far as known confined to the mountain pine-oak forests of central and western Michoacan (Patzcuaro, Patamban, Nexpa River, and Mt. Tancitaro).

Fish and Wildlife Service, Department of the Interior, Washington, D. C.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

SOME NOTES UPON WEST AMERICAN
TURRID MOLLUSKS

BY PAUL BARTSCH*

In the preparation of a monograph on the East Pacific turrid fauna, which embraces the largest gastropod family on the coast, I have received the finest cooperation of mollusk students on the west coast that one could desire. In many instances anatomic material has been furnished, which greatly aids in the unraveling of the much confused, inadequate classification used today.

A recent sending from Mrs. H. R. Turver of Santa Cruz, California, contains a number of things which require nomenclatorial consideration, and the description of some new species, which are furnished herewith.

Among this sending is a specimen of *Lophiotoma* (*Polystira*) *nobilis* (Hinds) (= *Pleurotoma nobilis* Hinds). This species was based on a specimen dredged by H.M.S. *Sulphur* in "7 fms. among mud at San Blas Mexico," and described by Hinds in the Proceedings of the Zoological Society of London, 1843, on page 37. The species was practically lost until H. N. Lowe in January, 1930, dredged a specimen in 20 fms. off Guaymas, Mexico. This specimen is now Nat. Hist. Mus., Balboa Park, San Diego No. 22658.

Mrs. Turver's sending therefore represents the third individual known to me. It bears the U.S.N.M. No. 518403. She writes that another specimen is in the Turver collection. Therefore, four individuals of this magnificent species are known to science.

Mrs. Turver's sending contains 3 additional species that require naming. These I am christening below: Figures and detailed station records will be published in the monograph.

*Published by Permission of the Secretary of the Smithsonian Institution.

IMACLAVA, new genus.

Shell rather large, elongate-turritid, white or banded or spotted with chestnut brown. Nuclear whorls about 2, well rounded, smooth. The postnuclear whorls are appressed at the summit and slope gently to the concave sinal area. This part of the shell extends over almost half of the turns. Anterior to the sinal area, the whorls bear axial ribs which may be mere nodules or they may be elongated to extend over the base. In addition to this the sinal area is marked by fine spiral striations, while the ribbed portion of the shell is marked by strong, quite regularly spaced, spiral striations between which much finer spiral threads are present. Base moderately long, well rounded, and marked by the weak continuation of the axial ribs and by spiral sculpture corresponding to that of the spire. The columella is rather stout and marked by low, rounded spiral cords which are also marked by fine spiral hair lines. It likewise bears a rather strong basal fasciole, anterior to which it is marked by lines of growth only. These extend over the entire surface of the shell. Aperture irregularly pear-shaped. Posterior sinus deep and large with its edge outward reflected. Anterior to the posterior sinus, the outer lip is protracted and bears a strong stromboid notch a little posterior to its anterior termination. There is a heavy varix at some distance behind the edge of the outer lip. The inner lip is reflected over and appressed to the columella. The parietal wall is covered by a thick callus which forms a heavy hump at the posterior angle. The operculum is oval with apical nucleus and marked on the outside by concentric lines of growth. The radula bears a very small rachidian tooth followed by a broadly lunate, strongly denticulated lateral and rather long, dagger-shaped marginals with the basal portion almost appearing double.

Type: *Imaclava ima*, new species.

This genus is known to extend from the Gulf of California to Panama.

This genus belongs to the subfamily Clavinae, the radula of whose members possesses a rachidian, lateral, and marginal teeth.

Imaclava ima, new.

Shell large, elongate-turritid, of buff ground color usually banded or spotted with chestnut brown, with a brown varix. The nucleus consists of 2 small, well rounded, smooth turns. The postnuclear whorls are appressed at the summit. The sinal area practically extends from the summit to almost the middle of the turns and is marked by fine spiral striations as well as decidedly sinuous incremental lines. Anterior to the sinal area, the whorls are marked by knoblike axial ribs of which 9 are present on the last turn posterior to and including the varix. On the last whorl these become enfeebled and extend feebly over the base. The

anterior portion of the spire also bears rather broad, strongly incised, shallow spiral grooves which separate slightly rounded areas about twice as wide as the grooves, the entire surface being marked by fine spiral hair lines. The base is well rounded and marked by 4 spiral cords resembling those on the spire, which are also marked by fine hair lines. The columella is rather long, somewhat sinuous, and moderately stout, and bears a strong fasciole. Posterior to the fasciole it is marked by 4 spiral threads corresponding to those on the base. Aperture irregularly pear-shaped. The posterior sinus is deep and broad with the edge outward reflected. Posterior to the posterior sinus, the outer lip connects with the heavy lump on the parietal wall at the posterior angle of the aperture. Anterior to the sinus it is protracted into a clawlike element with the edge rendered slightly fluted by the external sculpture. The outer lip bears a strong stromboid notch at some little distance posterior to its anterior termination, and a heavy varix at some distance behind the edge of the outer lip. The anterior canal is moderately long and moderately broad and moderately reflected. The inner lip is reflected over and appressed to the columella. The parietal wall is covered by a rather heavy callus which forms a knob at the posterior angle of the aperture. The operculum is oval with apical nucleus and marked on the outside by concentric lines of growth. The radula bears a very small rachidian tooth followed by a broadly lunate, strongly denticulated lateral and rather long dagger-shaped marginals with the basal portion almost appearing double.

The type, U.S.N.M. No. 55239, comes from the Stearns Collection and was collected in San Lucas Cove, Lower California. It has 13.5 whorls and measures: Height, 47 mm.; greater diameter, 18 mm.; length of aperture, 18.2 mm.

We have 14 additional lots in the collection containing 17 specimens, the localities ranging from San Lucas Cove, Lower California, to Guaymas, Mexico.

Genus KNEFASTIA Dall.

This genus, typified by *Pleurotoma olivacea* Sowerby, belongs to the subfamily Clavatulinae, that is, its members possess a radula with a small rachidian tooth and Y-shaped marginals. Typical *Knefastia olivacea* (Sowerby) comes from Panama and differs from those of the Gulf of California in having lirations on the inside of the outer lip, which are wanting in the Gulf of California species. This may be known as:

Knefastia dalli, new species

1843. *Pleurotoma funiculata* Reeve, Conch. Iconica. pl. 11, fig. 95.
 Not *Pleurotoma funiculata* Kiener, 1839, Icon. Coq. Viv.,
 p. 24, pl. 16, fig. 1.

Shell very broadly fusiform, covered with an olivaceous epidermis which sometimes has a brownish tint. After the epidermis is removed, the shell is pinkish white, variously variegated, blotched, and streaked with brown. The nucleus consists of a single smooth turn. The postnuclear whorls are appressed at the summit with an impressed line a little below the summit, which gives the summit the impression of being bounded by a cord. The posterior half between the summit and the suture is concave and marked by strongly retractive lines of growth which are really the filling up of the sinus. The anterior half of the space is marked by strong nodulose axial ribs which are crossed by four spiral cords, of which three are equal, while the first posterior to the nodules is weakest. Of the nodules 8 occur on the early whorls and 12 on the penultimate. The round portion of the base posterior to the periphery is marked by 3 equally strong and equally spaced spiral cords, which, like those of the spire, pass undiminished over the ribs and intercostal spaces. The attenuated portion of the base is rather stout and marked by 12 spiral cords which become successively weaker and closer spaced anteriorly. Aperture narrowly pear-shaped; posterior angle acute. Outer lip thin at the edge, rendered sinuous by the spiral cords, with a decided sinus in the concave portion immediately anterior to the summit; columella covered on its inner border by a thin callus which completely covers the ribs; parietal wall also covered by a thin callus. The operculum is claw-shaped with pointed apical nucleus; it has a strong ridge on the right margin; the exterior is marked by concentric strong incremental threads. The attachment scar on its inner surface is deeply impressed. The radula has a small rachidian and Y-shaped marginal teeth.

The type, U.S.N.M. No. 59347, comes from the Gulf of California. It has 7.5 postnuclear whorls remaining and measures: Height, 6.1 mm.; greater diameter, 24.5 mm.; length of aperture, 30.7 mm.

We have 14 additional lots, embracing 26 specimens, all from the Gulf of California.

Genus *ANTIPLANES* Dall.

The species of this genus are in a delightful muddle. Under it have been lumped members belonging to entirely distinct groups. Mrs. Turver's sending contains 2 specimens brought up by fishermen on black cod lines from 1200 ft. depth at Monterey Bay, Santa Cruz, California. These belong to an unnamed species which I have christened *Antiplanes major*, new species.

Antiplanes major, new species.

Shell very large, elongate-turritid, covered by a reddish olivaceous thin periostracum. Interior of the aperture with a brownish flush which is intensified in a narrow band at the summit and another one at the insertion of the columella. In some specimens the entire aperture is brown. Nuclear whorls 2, small, smooth, forming a slightly expanded tip. The postnuclear whorls are slightly rounded, very narrowly shouldered at the summit and marked by rather strong incremental lines which are decidedly sigmoid and follow the outline of the posterior sinus. The channel and the region posterior to it are marked by inconspicuous, microscopic, spiral threads. In addition to this, fine oblique dendritic threads are present which radiate retractorily from the median portion to the posterior sinus. Anterior to the posterior sinus the whorls are marked by strong spiral threads which vary in size and spacing. Base rather long, marked by incremental lines and spiral threads which are stronger than those on the anterior portion of the whorls. Columella rather long marked like the base. Aperture elongate tear-shaped with the anterior channel rather long and broad. The posterior sinus is deep and the outer lip is protracted anterior to it. The inner lip is sinuous and marked as a smooth resorption area.

The type, U.S.N.M. No. 224347, was dredged by the U. S. Bureau of Fisheries Steamer *Albatross* at Station 3172, off Bodega Head in 62 fms., lat. $38^{\circ} 23' 35''$ N., long. $123^{\circ} 14'$ W., on black sand bottom; bottom temperature 48° F. It has 9 whorls remaining and measures: Height, 54.6 mm.; greater diameter, 15 mm.; length of aperture, 22 mm.

In addition to this we have 38 lots, embracing 110 specimens the localities ranging from off Bodega Head to Point Loma Light House, with depths from 43 fms. to 278 fms.

This species can readily be distinguished from all other California *Antiplanes* by its huge size.

PROCEEDINGS
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GENERAL NOTES.

THE CAVE SALAMANDER IN VIRGINIA.

The range of the Cave Salamander, *Eurycea lucifuga* (Rafinesque), as stated by both Stejneger and Barbour (1943, Checklist of North American Amphibians and Reptiles, 5th Edition, p. 33) and Bishop (1943, Handbook of Salamanders, p. 431) does not include Virginia, despite the fact that Bishop's distributional map (loc. cit., p. 432) for the species indicates that it occurs in the southwestern corner of the state. The species has, however, been reported from Giles County, Virginia by Dunn (1936, List of Virginia amphibians and reptiles, Haverford, Pa., mimeographed, p. 2).

The following records for *E. lucifuga* in Virginia, accumulated as a result of the cave collecting activities of The National Speleological Society and augmented by records of specimens in various museum collections, are thus presented to more definitely establish this cave-inhabiting salamander in the state as well as to more accurately delineate its present distribution. The sources of these records, and the abbreviations used to designate them, are as follows: National Speleological Society (NSS), Virginia Polytechnic Institute (VPI), United States National Museum (USNM), Carnegie Museum (CM), Academy of Natural Sciences of Philadelphia (ANSP), and the personal collection of the author (JAF). For making these records available, the writer extends his thanks to the following persons: Dr. Doris M. Cochran, Mr. M. Graham Netting, Dr. Helen T. Gaige, Dr. Arnold Grobman, and Mr. Charles E. Mohr. Especial thanks are due Dr. Herbert W. Jackson of the Biology Department, Virginia Polytechnic Institute, who generously contributed his records for this species from caves in southwestern Virginia as a basis for this paper. The records follow:

TAZEWELL COUNTY:

Cassel Cave, Burke's Garden - 2 collected July 15, 1941 (ANSP Nos. 24744-45).

GILES COUNTY:

Cave, Sinking Creek, nr. Newport—1 collected July, 1935 (USNM No. 99106). (Specimen reported by Dunn, loc. cit.)

Cave, nr. Newport—1 collected 1938, alt. 2000 ft. (CM No. 13989).

New River Cave, Goodwin's Ferry—1 collected Feb. 14, 1943 (VPI).

Lucas Cave, Newport—2 collected April 11, 1943 (VPI).

Canoe Cave, Newport—1 collected April 15, 1943 (VPI).

Tony's Cave, Newport—1 collected May 9, 1943 (VPI).

Smoke Hole Cave, Newport—2 collected May 9, 1943 (VPI).

CRAIG COUNTY:

Two-mile Cave, nr. Looney, Meadow Creek—1 collected May 30, 1943 (VPI)

Fish Hatchery Cave, nr. Looney, Meadow Creek—4 collected May 30, 1943 (VPI); 2 collected Oct. 31, 1943 (JAF No. 812).

ROCKBRIDGE COUNTY:

Buck Hill Cave, Natural Bridge—2 collected June 6, 1943 (NSS); 5 collected Oct. 30, 1943 (JAF No. 813).

Physiographically these records are representative of the Valley and Ridge Province of the Appalachian Highlands. Elsewhere the range of *E. lucifuga* also includes the Appalachian Plateaus Province of the Appalachian Highlands, the Interior Low Plateaus and Central Lowland of the Interior Plains, and the Ozark Plateaus of the Interior Highlands. Of these other provinces the Appalachian Plateaus Province (Kanawha section) occurs in Virginia. There are apparently no records for *E. lucifuga* from this province in Virginia.

So far as drainage is concerned, those records from Tazewell and Giles Counties are in the New River drainage, while those from Craig and Rockbridge Counties are in the James River drainage. The New River is tributary to the Mississippi River by way of the Kanawha and Ohio Rivers. The James River, on the other hand, flows east into the Atlantic Ocean. In this latter connection, the specimens from Craig County were collected in caves along Meadow Creek, a headwater tributary of the James River near the drainage divide between it and the New River. The specimens from Rockbridge County, also in the James River basin, extend the range of this salamander in Virginia considerably north and east. Moreover, the specimens from both Craig and Rockbridge Counties represent the only records for this species throughout its entire range from a stream flowing east into the Atlantic Ocean. Significantly, however, the James River, although flowing east, arises west of the Blue Ridge and follows a course across it.

In view of the occurrence of *E. lucifuga* in the James River drainage, future collecting, particularly in caves and cavernicolous habitats, should help to determine the extent to which this salamander is established in this watershed, as well as to indicate whether or not it occurs east of Natural Bridge.

J. A. FOWLER.

TIMBER RATTLESNAKE IN THE DISTRICT OF COLUMBIA REGION.—In his well-prepared and as yet un superseded "List" of forty years ago, W. P. Hay said, "The evidence as to the occurrence of the rattlesnake within our limits is not altogether satisfactory." As to modern occurrence, that statement covers the situation. However habitat suitable for the rattler abounds along the upper Potomac and the river provides a travelway from the mountains, rendering it almost certain that the species, at least in earlier days, was represented within the accepted limits of the District of Columbia fauna. David Baillie Warden noted the rattlesnake as present at Great Falls in a book published in 1816.* A considerably more recent record that seems entirely acceptable should be drawn to the attention of naturalists interested in the Fauna Columbiana. It is by David Starr Jordan—a good authority—appearing in his autobiography, "The Days of a Man" (1922, Vol. 1, p. 283), and reading as follows: "The first and biggest rattler I ever saw at large, and the only one by which I was ever placed in danger, I came upon in 1878 near Falls Church, Virginia, not ten miles from Washington. Kneeling to drink at a fine spring in the woods, I suddenly caught sight of the reptile—*Crotalus horridus*—coiled on the moss just above the spring, in excellent position to strike."

W. L. McATEE.

* A chorographical and statistical description of the District of Columbia, p. 13.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

FOUR NEW ERMINES FROM
THE ISLANDS OF SOUTHEASTERN ALASKA ¹

BY E. RAYMOND HALL

Four previously unrecognized kinds of weasels have been found on the islands of southeastern Alaska. The degree of morphological difference between any two kinds on adjoining islands is about the same as between a pair of related subspecies on the adjacent mainland. For this reason the insular forms are regarded as subspecies rather than distinct species although geographical intergradation is obviously impossible. All four are members of the group of short-tailed weasels to which the specific names *cicognanii*, *richardsonii*, *streatori* and *arctica* have been applied in recent years. As will be shown in a later and a more extensive paper, each of the above-mentioned weasels is a geographic race of a circum-boreal species of which the Old World ermine, *Mustela erminea*, was the first named and that name therefore is used for the name of the species as a whole.

The new subspecies may be described and named as follows:

Mustela erminea salva, new subspecies.

Type.—Male, adult, skull-alone; no. 74641, Mus. Vert. Zool.; Mole Harbor, Admiralty Island, Alaska; December 27, 1936; obtained by Allen E. Hasselborg.

Range.—Admiralty Island, Alaska.

Diagnosis.—Size: An adult male from Gambier Bay and a subadult female from Hawk Inlet, measure, respectively: Total length, 320, 250; length of tail, 95, 70; length of hind foot, 45 (41 dry), 33.

Color: Winter pelage all white except tip of tail. Summer pelage with upper parts uniform in color and darker (16 n) than Raw Umber of Ridgway (Color Standards and Color Nomenclature, Washington, D. C.,

¹ Contribution from the University of California Museum of Vertebrate Zoology with assistance from the John Simon Guggenheim Memorial Foundation.

1912) and Chocolate tones 3 to 4, of plate 343 of Oberthür and Dauthenay (*Répertoire de Couleurs*, Rennes, Imp. Oberthür, Paris, Libraire horticole, 1905). Underparts Colonial Buff to Primrose Yellow of Ridgway (*op. cit.*), nearly white on chin and insides of forelegs; color of underparts extends narrowly over upper lips, distally on posterior sides of forelegs onto antipalmar faces of toes and sometimes over most of antipalmar surface of forefeet, on medial sides of hind legs to a point between knee and ankle but reappears on antiplantar faces of toes and in some individuals is narrowly continuous onto toes. Least width of color of underparts in four individuals 40 (38-43) per cent of greatest width of color of upper parts. Black tip of tail, in two individuals of which external measurements are given above, 50 and 40 mm. long, respectively, which is 53 and 57 per cent of length of tail-vertebrae.

Skull (based on 5 adult males, 2 adult females, and 1 subadult female, all from the type locality): Weight, including lower jaws, 1.7 (1.5-1.9) grams in males and 0.9 (0.8-1.0) grams in females; basilar length, 37.8 (36.4-39.5) mm. in males and 33.0 (32.0-33.6) mm. in females; length of upper tooth rows about equal to length of tympanic bulla in each sex; breadth of rostrum measured across lacrimal processes less than a third of basilar length in males and about 30 per cent of basilar length in females; interorbital breadth in males rarely more, and in females always less, than distance between glenoid fossa and posterior border of external auditory meatus; zygomatic breadth less than distance between last upper molar and jugular foramen in each sex.

Comparisons.—From *Musela erminea alascensis* of the adjacent mainland, which the newly named subspecies most closely resembles among named kinds, *salva* differs in that males have the preorbital region slightly wider in relation to the length of the tympanic bullae and the brain case is smaller, actually as well as in comparison with the preorbital part of the skull. The tympanic bullae do not project as far below the squamosals and the brain case itself is shallower, averaging, in adults, 11.5 mm. as against 12.5 mm. The overall depth of the brain case, including the tympanic bullae, when divided into the orbitonasal length gives an average figure of 93 (90-97) per cent whereas in *alascensis* the figure is only 85 (78-88) per cent. On this basis alone, every one of the adult skulls of the two races can be distinguished. The females and subadult males show the same tendency to reduction in the brain case but not every individual among them can be surely distinguished. By weight, the skull of corresponding sex is only about 6 per cent smaller. Comparison with *M. e. initis* and *M. e. celenda* are made in the accounts of those subspecies.

Specimens examined.—Total number, 26, all from Admiralty Island, Alaska. Unless otherwise indicated specimens are in the Museum of Vertebrate Zoology. Hawk Inlet, 2; Seymour Canal, 4; Mole Harbor, 18 (skulls-alone); Gambier Bay, 1; no locality more definite than Admiralty Island, 3 (1 in U. S. Nat. Mus.).

***Mustela erminea initis*, new subspecies.**

Type.—Male, adult, skull with skin; no. 289, Mus. Vert. Zool.; Saook Bay, Baranof Island, Alaska; October 9, 1907; obtained by Allen E. Hasselborg, original no. 4.

Range.—Chichagof and Baranof islands, Alaska.

Diagnosis.—Size: Two adult males, type and a topotype, measure respectively as follows: Total length, 330, 320; length of tail, 95, 95; length of hind foot, 45, 45. No external measurements of female available.

Color (based on 2 young females): As described in *Mustela erminea salva* except that: Least width of color of underparts 49 and 50 per cent of greatest width of color of upper parts. Black tip of tail in three young female topotypes averaging 54 (52–55) mm. which is 67 (63–69) per cent of length of tail-vertebrae.

Skull of male (illustrated by the type and one adult topotype): Weight, 2.3 and 2.5 grams; basilar length 39.6 and 40.5 mm.; length of upper tooth rows less than length of tympanic bulla; breadth of rostrum measured across lacrimal processes less than a third of basilar length; interorbital breadth equal to distance between glenoid fossa and posterior border of external auditory meatus; zygomatic breadth less than distance between last upper molar and jugular foramen. No skull of adult female available.

Comparisons.—From *M. e. salva*, *initis* differs in that skulls of males average larger in every measurement taken and are 41 per cent heavier. In relation to the basilar length, the interorbital and preorbital parts of the skull are larger; the greater widths, in relation to the basilar length, of the interorbital region and across the mastoidal processes are especially noticeable. Although the depth of the brain case, including the tympanic bullae, is both relatively as well as actually more than in *salva*, the depth is relatively less than in *alascensis* which otherwise differs from *initis* in about the same way that *salva* differs from *initis*. Whereas the interorbital breadth in *initis* is about equal to the distance between the glenoid fossa and the posterior border of the external auditory meatus, the interorbital breadth is uniformly less than this distance in both *salva* and *alascensis*. In comparison with *seclusa* the teeth are of the same size but all measurements of the skull are larger, and the skull of *initis* is 25 per cent heavier. In relation to the basilar length, the interorbital and preorbital parts of the skull are much smaller in *initis*. Comparison with *celenda* is made in the account of that form.

Remarks.—The one specimen available from Chichagof Island, though labeled a male, probably is a female. In it the medial side of the tympanic bulla is fuller (less scooped out) than in any one of the three specimens probably females, of corresponding age, from Baranof Island. Additional specimens from these two islands, especially from Chichagof Island, will be required to learn if ermines are subspecifically the same on the two islands.

Specimens examined.—Total number, 6, all in the Museum of Verte-

brate Zoology. Chichagof Island, Freshwater Bay, 1. Baranof Island, Saook Bay, 5.

Mustela erminea celenda, new subspecies.

Type.—Male, adult, skull and skin; no. 130987, U. S. National Mus., Biol. Surv. Coll.; Kasaan Bay, Prince of Wales Island, Alaska; June 16, 1903; obtained by Cyrus Catt; original no. 4407x.

Range.—Prince of Wales, Dall, and Long islands, Alaska.

Diagnosis.—Size: Seven males, adults and subadults, from Prince of Wales Island, have average and extreme measurements as follows: Total length, 286 (277–304); length of tail, 77 (74–85); length of hind foot, 36 (35.5–40.5). No females known.

Color: As described in *Mustela erminea salva* except that upper parts about tone 3 of dark chocolate brown of plate 342 of Oberthür and Douthenay (*op. cit.*); lower throat and chest covered by a large patch of same color as upper parts; color of underparts extending to toes but in interrupted fashion on both fore- and hind-feet; least width of color of underparts averaging, in four males from Prince of Wales Island, 41 (38–40) per cent of greatest width of color of upper parts. Black tip of tail averaging, in 8 males in winter pelage, 65 (59–78) mm. which is 84 (69–92) per cent of length of tail-vertebrae.

Skull (illustrated by 5 adult males): As described in *Mustela erminea initis* except that: Weight, 2.3 (2.2–2.5) grams; basilar length, 39.5 (38.9–40.7) mm.; length of upper tooth rows more than length of tympanic bulla; breadth of rostrum measured across lacrimal processes more than a third of basilar length; interorbital breadth more than distance between glenoid fossa and posterior border of external auditory meatus; zygomatic breadth more or less than (about equal to) distance between last upper molar and jugular foramen. No complete skull of adult female available.

Comparisons.—From its geographic neighbors, *alascensis* and *initis*, *celenda* differs in darker color of upper parts, presence rather than absence of patch of dark color on lower throat and chest, and longer black tip on the tail. From *Mustela erminea haidarum* of the Queen Charlotte Islands, British Columbia, to the south, *celenda* differs in darker color of upper parts, presence rather than absence of patch of dark color on lower throat and chest, narrower light-colored underparts, black tip of tail averaging less rather than more than nine-tenths of length of tail-vertebrae, and ventral face of tail colored like upper parts rather than like underparts.

In addition to the cranial differences noted between *initis* and *celenda* in the above diagnosis, *celenda* differs also in larger interorbital and pre-orbital parts of the skull although dimensions of other parts of the skull and of the teeth are about the same or even less. From *salva*, differences are larger average size in every measurement taken save that of the diameter of the inner lobe of the upper molar which is about the same. The skull of *celenda* is 35 per cent heavier than that of *salva* and in rela-

tion to the basilar length is wider, particularly in the interorbital and preorbital regions. From *seclusa*, in which the teeth are of comparable size, *celenda* differs in that every cranial measurement is larger and the skull with the lower jaws is 28 per cent heavier. The skull of *celenda* is much longer than in *seclusa* and the width and depth in relation to the length, are less than in *seclusa*. *M. e. celenda* is larger in every part measured than *Mustela erminea haidarum*, 21 per cent heavier, and in relation to the basilar length the interorbital, and preorbital, parts of the skull are smaller, the brain case is shallower, and the skull is relatively wider across the zygomata and mastoid processes.

Remarks.—In both coloration and cranial characters the distinguishing features are pronounced and this ermine might well be accorded the rank of a full species were it not for other insular races, for example *initis*, which tends to bridge the gap between *celenda* and the race *alascensis* on the mainland. The specimen from Dall Island agrees in all respects with topotypes. The one from Howkan on Long Island is a white winter-skin with remains of a skull that suffered shrinkage from some chemical solution, and the reference of this specimen to *celenda* is tentative.

Specimens examined.—Total number, 25, all from Alaska. Arranged by localities from north to south and unless otherwise noted in the United States National Museum. *Prince of Wales Island*: Craig, 18 (10 in Mus. Vert. Zool., and 8 in Los Angeles Mus. Hist. Art and Sci.); Kasaan Bay, 2; no locality more definite than the Island itself, 3. *Dall Island*: Otter Harbor, 1 (Los Angeles Mus. Hist. Art. and Sci.). *Long Island*: Howkan 1 (Field Mus. Nat. Hist.).

***Mustela erminea seclusa*, new subspecies.**

Type.—Male, adult, skull-alone; no. 31232, Mus. Vert. Zool.; Port Santa Cruz, Sumnez Island, Alaska; March 24, 1920; obtained by George Willett.

Range.—Known only from the type locality.

Diagnosis.—Skull of male as described in *Mustela erminea initis* except that: Weight, 1.8 grams; basilar length, 34.3; length of upper tooth rows about same as length of tympanic bulla; breadth of rostrum measured across lacrimal processes more than a third of basilar length; interorbital breadth more than distance between glenoid fossa and posterior margin of external auditory meatus; zygomatic breadth more than distance between last upper molar and jugular foramen. Female unknown as likewise are external measurements and skin of male.

Comparisons.—From *alascensis* and *salva*, *seclusa* differs in larger teeth, shorter skull, much larger preorbital and interorbital regions, actually as well as in relation to the basilar length. Except the teeth, which are of about the same size, the same general differences obtain in comparison with *initis* which, however, is 29 per cent heavier. From *celenda*, *seclusa* differs in smaller skull in all parts measured, being 22 per cent lighter. The teeth are about the same size. In relation to its

length, the skull of *seclusa* is much broader and deeper. From *Mustela erminea haidarum*, *seclusa* differs in: teeth larger; skull shorter and more convex in dorsal outline along median longitudinal axis. Also, in relation to the basilar length, the skull is broader and deeper and the brain case is relatively shorter.

Remarks.—The characters shown in the one available skull are so far outside the limits of variation for other known races that confidence is felt in designating a new subspecies for its reception. Other specimens are much to be desired to ascertain what the "average" is like and to learn the subspecific characters of the female.

Specimen examined.—One, the type.

CRANIAL MEASUREMENTS, IN MILLIMETERS, OF ADULT SPECIMENS
FROM THE TYPE LOCALITIES OF FOUR SUBSPECIES OF *MUSTELA ERMINEA*.

(Figures in parentheses are average.)

<i>Catalog no. or no. of individuals averaged</i>	<i>salva</i> ♀ 74653	<i>salva</i> ♂ 12	<i>initis</i> ♂ type 286	<i>celenda</i> ♂ 5	<i>seclusa</i> ♂ type
Basilar length of Hensel.....	33.1	32.0	40.5	39.6	34.3
Length of upper tooth rows ²	10.9	11.0	13.9	13.5	12.6
Breadth of rostrum across lacrimals.....	10.2	9.5	12.8	13.1	12.6
Least interorbital breadth.....	8.7	7.5	10.6	11.4	10.6
Orbitonasal length ³	11.1	11.4	14.4	15.0	13.9
Mastoid breadth.....	16.7	15.4	22.1	22.0	20.2
Zygomatic breadth.....	18.7	17.1	24.5	24.3	22.7
Length of tympanic bulla.....	11.7	11.0	14.8	13.6	12.7
Length of first upper molar.....	3.8	3.9	5.2	5.0	5.1
Length of P ⁴ on lateral side.....	3.6	3.7	4.7	4.7	4.7
Breadth of first upper molar.....	3.0	2.9	4.1	3.6	3.8
Length of first upper molar.....	1.5	1.5	1.9	2.1	1.8
Depth of skull at ant. margin of basioccipital.....	9.8	8.9	13.1	12.3	12.3
Depth of skull at post border of upper molars.....	9.0	8.4	11.4	12.0	11.5

² Along median longitudinal axis of skull from anterior faces of incisors to a line connecting posterior margins of molars.

³ Measured diagonally from posteriormost margin of anterior nares to posterior side of postorbital process near its tip.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NOMENCLATORIAL NOTES ON *Laternaria* L., *Fulgora*
L. AND *Delphax*, FABR.

By R. G. FENNAH,

Entomologist, Food-crop Pests Investigation, Windward and
Leeward Islands.

In 1758 Linnaeus (Syst. Nat. 434) described *laternaria* as his first species under the genus *Cicada*, with the following description and references:

1. *C. fronte rostrata ovali recta, alis lividis; posticis ocellatis.*
Grew. mus. 158 t. 13 *Cucujus peruvianus.* *Merian. Sur.* t. 49.
Laternaria.
Reaum. ins. 5. t. 20. f. 6, 7. *Roes. ins.* 2. *gryll.* t. 28, 29.
Habitat in America calidiore. *Prominente fronte noctu lucem vivacissimum spargit.*

The specific name is adopted from Merian (latin edition), who wrote "persuasum mihi ab Indis est ex hoc muscae genere ita dictos Laternarios produci, formatos ut hic in mare et foemina tam volitante quam quiescente delineavi." This name is invariably quoted by Linnaeus after the Merian reference.

In 1764 he erected the genus *Laternaria* with two species, *phosphorea* and *candelaria*, the former being the first species and being described as follows:

1. *Laternaria fronte ovali recta, alis lividis; inferioribus ocellatis.*
Syst. Nat. 434. n. 1.
Vincent. mus. 9 *Musca laternaria americana noctu lucens.*
Grew. mus. 158. t. 13 *Cucujus peruvianus.* *Merian. Surin.* 49.
t. 49 *Laternaria.*
Reaum. ins. 5. t. 20. f. 6, 7. *Roes.* 2. *gryll.* t. 28, 29.
Habitat in America calidiore.

The species *phosphorea* is the same as *Cicada laternaria* L. 1758. By Opinion 16 of the International Commission on Zoological Nomenclature.

ture such treatment by Linnaeus of new genera in relation to older species bearing the same name and included in the new genus under a different name is to be considered as establishing tautonomy. Accordingly in this case *Laternaria* takes as its type its species *laternaria* L. 1758)=*phosphorea* L. (1764) by absolute tautonomy.

The genus *Fulgora* erected by Linnaeus in 1767 contains *laternaria* L. as its first species. As it contains the type of *Laternaria* (and, indeed, all the species of *Laternaria*) it falls into synonymy with this genus.

The genus *Delphax* was erected by Fabricius in the Supplement to his *Entomologia Systemica* in 1798 (pp. 511, 522). In 1792 Walbaum listed but did not accept or adopt Klein's 1744 genera of fishes and aquatic mammals, and among these appeared a genus *Delphax*.

According to Opinion 21 of the International Commission the fact that Walbaum published Klein's 1774 genera in 1792 does not make them valid. The genus *Delphax* Fabricius is accordingly not preoccupied, and is valid.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

NOTES ON FISHES IN THE ZOOLOGICAL MUSEUM
OF STANFORD UNIVERSITY.

XVII. NEW FISHES FROM JOHORE AND INDIA.

BY ALBERT W. C. T. HERRE.

In the fall of 1940 nearly two months were spent in collecting in Singapore, Johore, Perak, and Pinang, in the Malay Peninsula. This was followed by nearly four months in India, where field work was done from Calcutta to Trivandrum and to Krusadai, the latter in the Gulf of Manaar. Our knowledge of the distribution of both marine and fresh water fishes was greatly increased, and many rarities and a number of new species were discovered.

One of the most interesting was the discovery of a second species of *Homaloptera* in Johore, and the taking of another specimen of the one I discovered there in 1937. Many fishes hitherto known only from the rivers of Sumatra and Borneo were found to occur also in the Malay Peninsula.

In exploring the waters of such a vast area as India, the discovery of new species is to be expected. The first attempt to study the fishes of India as a whole was that of Day, whose monumental work, "The Fishes of India" appeared in 1878-88. For the past quarter of a century various Indian students, Mukerji, Prashad, Job, Law, Misra, Sundara Raj, and above all S. L. Hora, have been working mainly on the vast fresh-water fish fauna of India, with relatively little attention to brackish water and estuarine fishes. The explorations of the "Investigator" and the "Golden Crown", and the studies by Alcock, Annandale, and Jenkins of the fishes thus obtained, were the only attempts to study seriously the marine fishes of India during

the last forty years. When proper effort is bestowed upon studies of the littoral and off-shore fishes of India, and large collections made by modern intensive methods along the Coromandel, Malabar, and Sind coasts, a wealth of new and little known fishes may be expected.

Types of the new species here described are in the Natural History Museum of Stanford University. Lengths mentioned are the standard length.

The Atherinidae or silver-sides are silvery fishes, most of them small and slender, occurring in large shoals in all tropical and temperate seas. The principal member of the sub-family Atherininae is the genus *Atherina*, which occurs throughout and has given rise to a number of other genera which gradually diverge from it in appearance and structure. The most highly specialized genus of this assemblage is *Iso*, hitherto known from three widely separated localities, Japan, Australia, and Natal, South Africa. *Iso natalensis* is known only from a single example, 52 mm. long, imperfectly described and poorly figured. I have examined ample material of the Japanese and Australian species, and find them markedly different from each other and from the Indian species. The species are surf dwellers, and it was a great surprise and pleasure to find *Iso* living in the surf of Indian shores.

While *Iso* is evidently derived from *Atherina*, it is strikingly dissimilar. The body is very much compressed, deepest just behind the head, and has a keel along the belly. The head is as deep as long; the two dorsals are well separated; the second dorsal is like the anal but shorter, the anal with 21 to 27 rays. The head and anterior dorsal and ventral regions are scaleless. In life *Iso* is translucent, with a broad brilliant silvery band from behind the pectoral fin to the caudal peduncle or caudal base.

Iso flos-indicus Herre, new species.

Dorsal IV or III-I-13 to 15; anal I-21 to 24; scales in a lateral series 40 to 44; gill rakers 3 plus 10.

The depth is 3.33 to 3.53, the head 4.4 to 4.5, the caudal 4.66 to 5 times in the length. The eye is 2.9 to 3.1 times in the head and may be more or less than the snout and postorbital, but usually equals the snout and is a little less than the postorbital. The mouth is very oblique, the maxillary sometimes extending to beneath the anterior part of the eye, but usually not reaching a vertical from the anterior margin of the eye. There are 3 rows of teeth in the upper jaw, those of the outer row curved, widely spaced, and much larger than the others; they remain outside the mouth when it is closed, and above this row one or two additional rows of small teeth are usually present. The toothed outer surface of the maxillary is conspicuous in this species; as far as known, the other members of this genus have the maxillary smooth externally. No vomerine teeth were found.

The scales are more or less deciduous, but the scalation conforms to the

generic pattern. The greatest depth is over the pectoral base; in the smallest specimens the greatest depth is over the gill opening, at the hind margin of the head. As specimens become larger the greatest depth moves posteriorly. The pectorals are placed very high up; any further upward position would place them on the back. In general, this species agrees in form and proportions with the other species, which all have a strong similarity.

The color in alcohol is gray or yellowish, the sides of the head bright silver; a broad silver band extends from behind the pectoral base to the caudal peduncle where it pinches out, to reappear as a silvery black spot on the caudal base. A black line forms the upper margin of the silver band, which may be perfectly clear, but is usually more or less sprinkled with black dots. The breadth of the silver band equals or is less than the diameter of the eye, and is much less than the length of the ventrals; it is noticeably narrower than in *Iso flos-maris*, where the silver band is wider than the eye and equals the length of the ventral fin. The width of the silver band in *Iso rothophilus* is greater than in *Iso flos-indicus*, but less than in *Iso flos-maris*. On the occiput is a large brownish-yellow spot, more or less dotted with black. The upper and lower lips are dotted with black. The fins are colorless.

Described from the type, 42 mm. long, and 25 paratypes 23 to 40 mm. long, collected in the surf on the beach at Vizagapatam. Two paratypes, 36 and 37 mm. in length, were taken from the surf in a rocky cove at Konival, 10 miles south of Trivandrum, Travancore, India. This pretty little fish probably occurs on sandy beaches and rocky places along the entire coast of India.

Flos-indicus, flower of India.

KEY TO THE SPECIES OF ISO.

- A. Maxillary without external teeth.
- B. With vomerine teeth; scales about 59.....*ISO FLOS-MARIS*
(Distribution, Japan)
- BB. Vomerine teeth lacking or not yet known
- C. Scales 49; depth 3.5; dorsal IV-I-14-16; anal I-23-27.....
ISO ROTHOPHILUS
(Distribution, New South Wales)
- CC. Scale count not known; depth 3.25; dorsal IV-I-16; anal I-22....
ISO NATALENSIS
(Distribution, Durban, Natal)
- AA. Maxillary with external teeth; scales 40-44; dorsal IV or III-I-13-15; anal I-21-24.....*ISO FLOS-INDICUS*
(Distribution, Coromandel and Malabar coasts of India)

Ctenogobius andhraensis Herre, new species.

Dorsal VI-I-10; anal I-9; pectoral 18; scales in lateral series 28, rarely 29, with at least 4 rows of small scales on the caudal; scales in transverse series 8; predorsal scales small, 14 to 16, not extending to the eyes.

The body is moderately slender, the dorsal profile nearly horizontal,

the ventral outline gently convex, the last third of the body laterally compressed. The depth is about 5 times in the length, but in a female full of eggs it is less than 4.3. The head and caudal are approximately equal in length, 3.47 to 3.65 in the length, or the caudal may be a little shorter than the head. The eye is high up, dorso-lateral, in the front half of the head, in which it is contained 4.2 to 4.5 times. The distance from the hind margin of the eye to the tip of the snout is usually less, but sometimes is equal to the postorbital region. The interorbital is narrow, 2.5 to 2.7 times in the eye. The strongly convex snout is longer than the eye, 3.3 to 3.4 times in the head. The mouth is moderately oblique, the jaws equal, the posterior angle of the maxillary extending beneath the anterior part of the eye, or the front margin of the pupil. The upper jaw has a short outer row of 6 or 8 caniniform teeth, with 3 rows of very small teeth behind it. The lower jaw has 4 rows of teeth, the outer one slightly enlarged, with a large lateral curved canine, which in old males is visible when the mouth is closed. The free tip of the tongue is rounded.

The scales are large and ctenoid, except on the nape, pectoral base, preventral region, and belly, where they are cycloid. The first dorsal spines have filiform tips, not elongated in females, 6.8 or 6.9 times in the length and not reaching the second dorsal when depressed; males have the tips of the first and second spines much elongated and thread-like, extending upon the second dorsal when depressed, 4.6 to 3.9 times in the total length. The last ray of the second dorsal is elongate, 6.8 or 6.9 times in the total length. The last ray of the second dorsal is elongate, 6.8 or 6.9 times in the length in adult females and not reaching the caudal, but extending upon the caudal in adult males and 6 to 6.1 times in the length. The last anal ray equals the last dorsal ray but does not reach the caudal when depressed. The broad pectoral is 4 to 4.5, the ventral 4.5 to 5 times in the length, the latter not reaching the anus by one or two scales. A row of minute sensory papillae extends longitudinally across the middle of the cheek, and another nearly parallel one extends back from near the posterior angle of the maxillary; several rows of very minute papillae curve downward from the eye to the median longitudinal row; a vertical row on the opercle parallels its front margin. Five large mucus pores are along the groove extending from the eye and above the opercle, and another large pore is in the front part of the interorbital space. The anal papilla of females is short and semi-globose; that of males is thin, slender, and pointed.

The color in alcohol is pale yellowish gray, with 5 dusky spots in a median longitudinal row along the side, connected by a faint dusky line which extends to the tip of the caudal, but has faded in most specimens. The first spot is under the pectoral, the last one just before the caudal. On the back are indications of 8 dorsal cross bands; on the base of the upper 6 or 8 caudal rays is a white-margined blackish ocellus; just above the upper posterior angle of the opercle is a large dark blue or blackish blue spot with pearly lustre; on the upper part of the pectoral base is a brown spot, and some specimens show a similar but smaller spot on the

basal portion of the pectoral rays. In life the sides of the head and pectoral base were evidently nacreous, vestiges of their pearly lustre being still visible on some specimens. All the fins except the pectorals are more or less densely stippled with blackish dots.

Described from the type, a male 60 mm. long, 15 female paratypes 31 to 59 mm. long, and 13 male paratypes 29 to 55 mm. long. The largest female was ready to spawn when taken and is much bulkier than the type. Another female 55 mm long contains many eggs but is not nearly ready to spawn. These specimens were taken among the rocks on the beach at Vizagapatam, India.

Andhraensis, from Andhra, the ancient name of that part of India.

Tripterygium ellioti Herre.

Tripterygium trigloides Day, *Fishes India*, p. 336, 1888; (not of Bleeker).

Dorsal III–XIII–8–9–10; anal usually 18, but varying from 16 to 19; pectoral 14–16, the upper 8 or 9 rays divided, the lower 6 or 7 simple; lateral line scales 35 or 34.

Adults have the depth 4.5 to 4.7, the head 2.9 to 3.2, the pectoral 3.2 to 3.6, the ventral 4.25 to 4.5 times in the length; the caudal equals the depth. The head is very large and broad, with nearly vertical snout and prominent lips which are equal or the lower one slightly inferior, its physiognomy *Trigla*-like. The eye is large, high up, 3.3 to 3.4 times in the head, usually a little longer than the snout. The narrow interorbital is a third, or sometimes half an eye diameter in breadth. The mouth is rather large, slightly oblique, the angle of the maxillary beneath the front third or half of the eye. There is a short broad black tentacle on the upper part of the eye, its tip more or less short lobate or fringed; a similar but pale tentacle is on the nostril. Very young specimens, 8 to 12 mm. long, have the spinous dorsal continuous, so that there are but two dorsals. The two anterior spines grow very little, the third one not at all, so that by the time a fish is 18 mm. long the first three spines are separated from the rest and there are two spinous dorsal fins. Adult males may have the first spine of the first dorsal somewhat elongated, but none of the spines or rays become noticeably long.

In life adult males are brilliantly and beautifully colored. The trunk is suffused with reddish or orange, each scale outlined with dark dots; there is a brilliant blue ocellus on the pectoral base, margined with red, orange, or golden; the whole under side of the head, up to the eyes, is usually brilliant blue, but may be only heavily dotted with dark blue; the eyes and interorbital are golden red or orange; the abdomen and ventrals are also golden red; the anal is brilliant dark blue like the under side of the head; the second spinous dorsal has a basal blue band, the rest of the fin red or golden, with a marginal blue line; the first spine of the first dorsal is blue, the rest of the fin red or golden; the soft dorsal is colored like the second spinous dorsal, but is less brilliant; the caudal is largely bluish.

In alcohol the body is uniform brown, and the blue of the head and pectoral ocellus becomes black or dark bluish brown. The red and

golden of body and fins become whitish or pale, but the top of the eye is still reddish golden; the fins turn more or less dusky brown, their red bands colorless, while the ventrals and abdomen are pale yellowish.

Females and young males are much paler as a rule, with little or no high coloring, though some females are handsomely but not brilliantly colored. Adult females may have an ocellus more or less developed on the pectoral base, but it is never so large, brilliant, or glowingly margined as in males; it is often absent, merely represented by one or more small spots. The ground color of the body is pale golden or reddish, barred by 6 cross bands, each of which divides into two on the lower half of the body; the first bar is just behind the pectoral base, the last one before the caudal; the sides of the head are more or less spotted with reddish dots. The pectorals are cross-barred with 3 to 5 rows of reddish spots, and the caudal fin has 2 or 3 dark cross-bands; the vertical fins are clear, cross-barred by 1 to 3 rows of red brown dots. In alcohol the ground color is largely greenish gray, the spots darkened.

This little fish is no doubt abundant around rocks on all coasts of peninsular India. From the rocks on Maharaneputa Beach, Vizagapatam, were taken 120 specimens, from 20 to 36 mm. in length. Among the rocks at Waltair beach 2 or 3 miles further north, 40 specimens were taken, 38 of them 20 to 30 mm. in length; 2 others, 8 and 11.5 mm. in length, illustrate the original condition of the dorsal fin, as described above. From around rocks at Lawson's Bay, north of Waltair, 8 examples, 10 to 30 mm. in length, were secured. From a rock pool at Konival, 10 miles south of Trivandrum, Travancore, a single adult male, 32 mm. long, was collected. Others were seen but the sea became too rough to work among the rocks. The types are a male 32 mm. long and a female 36 mm. long, from Maharaneputa Beach, Vizagapatam; all those remaining are paratypes.

Day never saw a specimen of *Tripterygion* in India, but amongst Sir W. Elliot's drawings were colored illustrations of a male and a female of this genus. Specimens destined for Europe were destroyed in a storm, Dr. Day states. From these drawings Day gave a description and thought the species might be the *Tripterygion trigloides* of Bleeker. But this is impossible, for Bleeker's species has 50 to 55 scales, besides other marked differences, and also lacks the brilliant coloration characteristic of males of the present species. The fish observed by Sir W. Elliot has apparently never been taken by anyone else until my visit to Vizagapatam in December, 1940, and is without a name. I therefore take pleasure in giving it the name of its original discoverer.

Sir Walter Elliot, an official of the Madras Civil Service, employed native artists to make colored illustrations of the fishes of Madras and Waltair. Day says that they were beautiful and accurate, and comprised many hundred species, each with its native name attached, as well as Jerdon's identifications.

HOMALOPTERA van Hasselt, **emend.** van der Hoeven.

Neohomaloptera Herre, new sub-genus.

From Homaloptera as defined by Dr. S. L. Hora, in his monograph "Classification, Bionomics and Evolution of Homalopterid Fishes,"

Memoirs Indian Museum, Vol. XII, pp. 263-330, 1932, *Neohomaloptera* differs in the following respects:—Two pairs of barbels at the angle of the mouth, instead of but one; the rays of the pectoral and ventral reduced in number, the former with 12 or 13 instead of 14 to 20, the latter with 7 instead of 8 to 10; the pectoral further has but 3 or 4 simple rays, instead of 4 to 8. The caudal is slightly rounded, not forked or emarginate, as in typical *Homaloptera*; the caudal peduncle is short and as deep as long. The type of the sub-genus is *Homaloptera johorensis* Herre, new species.

***Homaloptera (Neohomaloptera) johorensis* Herre, new species.**

Dorsal I-7; anal II-5 or I-5; pectoral with 8 or 9 divided and 3 or 4 simple rays; ventral II-5; scales in the lateral line 32, plus 1 or 2 on the caudal base; 14 to 16 predorsal scales and 16 around the caudal base.

The depth is 5 to 5.1, the head 3.7 to 4, the caudal 4 to 4.1, the pectoral 3.6 to 4, the ventral about 5.2 times in the length. The eye is 4.25 to 4.5 in the head; the snout equals the postorbital part of the head, 2.2 in the head; the interorbital breadth is approximately twice the eye; the least depth of the caudal peduncle equals its own length.

The body is rather stout, its breadth nine-tenths of its height, the ventral profile straight and horizontal, the dorsal profile slightly arched and deepest at the dorsal origin, the head and predorsal region feebly depressed. The eyes are dorso-lateral, very high up. The snout is broadly rounded, its inner barbels equal to the eye, the longer outer pair 1.5 times the eye; the outer barbel on the maxillary angle is longer than the eye; the slender inner maxillary barbel is about a third as long as the outer one. The dorsal origin is opposite the 14th scale and well behind the ventral origin, which is opposite the tenth scale; that of the anal is opposite the 26th scale. The pectoral scarcely reaches the ventral origin. The rounded caudal equals or is less than the head; the dorsal height is 4.5 to more than 5 times in the length; the low anal is 6.4 to 7.2 in the length. The head is naked, the body scaled except on the ventral surface, which is naked as far back as the hind end of the ventral base.

The color in alcohol is more or less brown, everywhere stippled with minute black specks, interspersed with large circular black dots. On the posterior half of the smaller specimen are four broad black transverse bands, which are forked below the lateral line; on the larger specimen these bands only show above the anal and on the caudal peduncle. The dorsal has two transverse rows of black dots, and the caudal has one or two blackish cross bars. The other fins are colorless.

The type, 20.5 mm. long, and paratype, 18 mm. long, were taken from a brook near Simpang Rengam, Johore.

***Homaloptera tweediei* Herre.**

From a brook near Kota Tinggi, Johore, I collected a specimen of this little species, 19 mm. long. This is the second record, my previous collection having been made in the Mawai district, Johore, about 15 miles further north than Kota Tinggi.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW KANGAROO-RAT FROM SOUTHWESTERN
UTAH.

BY ROSS HARDY,

Dixie Junior College, Saint George, Utah

Specimens of kangaroo-rats from southwestern Utah collected during the past two years seem to represent a hitherto undescribed race. A description of the important characters of this subspecies is provided below.

My thanks are given to Mr. S. D. Durrant of the Museum of Zoology of the University of Utah for the use of comparative material. The type specimen has been deposited with the University of Utah. The other specimens are in the author's private collection.

The capitalized color terms in this paper are after those used by Ridgway, Color Standards and Color Nomenclature, 1912.

Dipodomys ordii cinderensis, new subspecies.

CINDER-CONE KANGAROO-RAT.

Type.—Male, adult, skin with skull; Museum of Zoology, University of Utah, No. 4611; at about 4,000 feet on sandy soil immediately north of the northern of two large cinder cones in Diamond Valley, 10 miles north of Saint George, Washington County, Utah; February 13, 1944; collected by Ross Hardy; original No. 2,690.

Distribution.—Known from sandy soils in sagebrush areas near the cinder cones of Diamond Valley and from similar areas of Mountain Meadows all in northern Washington County, Utah; north to the Escalante Desert and east to Parowan in Iron County, Utah.

Diagnostic characters.—A race closely allied to *Dipodomys ordii fetosus* but much darker in color, and with a shorter tail.

Measurements (in mm.).—Type: total length, 232; tail vertebrae, 124; hind foot, 38; ear from notch, 14. Skull: condylobasal length, 29.9; occipitonasal length, 34.4; length of nasals, 13.9; inter-orbital width, 12.1; greatest breadth across bullae, 23.2; greatest length of bullae as measured parallel with auditory opening, 15.0; from ventral symphysis of bullae to ventral edge of audital opening, 13.0; maxillary breadth, 19.5;

maxillary tooth row (alveolar), 5.0; diastema, 7.9; length of left auditory opening, 3.7; width of supra-occipital at dorsal crest between bullae, 2.6.

The average and extreme measurements of nine adults (7 males, 2 females) from the type locality are: total length, 235.3 (222-250); tail length, 126.7 (118-138); hind foot, 40.0 (38-43); ear from notch, 13.2 (12-14). Skull: condylobasal length, 29.7 (28.8-30.5); occipitonasal length, 33.9 (32.8-35.0); length of nasals, 13.2 (12.6-14.0); inter-orbital width, 11.7 (11.0-12.1); greatest breadth across bullae, 23.0 (22.3-23.7); greatest length of bullae as measured parallel with auditory opening, 14.9 (14.3-15.2); from ventral symphysis of bullae to ventral edge of auditral opening, 12.6 (11.7-13.7); maxillary breadth, 19.1 (18.2-20.0); maxillary tooth row, 5.0 (4.7-5.2); diastema, 7.9 (7.5-8.4); length of left auditory opening, 3.6 (3.2-3.9); width of supra-occipital at dorsal crest between bullae, 2.5 (1.9-3.2).

Description of pelage.—Color of type: General tone of upperparts near Buffy Brown mixed with blackish; cover hairs with subterminal band of Avellaneous tipped with black; clearer Avellaneous on the sides; dorsal hair pure Slate-Gray at base; dorsal tail stripe darker and more nearly black than ventral tail stripe and slightly wider than lateral white markings and extending to tip of tail; soles of feet, heels and inner sides of hind legs blackish; remaining underparts white; prominent arietiform markings of face, skin and most of hair on posterior half of ears, black.

Comparisons.—Compared with specimens of *fetusus* from the Desert Experiment Station in West Millard County, Utah, *cinderensis* is darker, not only in general pelage coloration but also has black instead of dark brown ears, darker facial markings and black instead of dark gray stripes on the tail and is slightly smaller than *fetusus* in cranial measurements. Compared with *panguitchensis* paratypes, *cinderensis* differs very little if any in color, but some specimens are slightly paler and many have white hairs on the upper posterior fold of the ear which *panguitchensis* lacks. From this race, *cinderensis* also differs in its smaller size, shorter tail, slightly larger skull with proportionately large bullae which are less widely separated by the supra-occipital on the dorsal surface of the skull. The auditory opening averages smaller in *cinderensis* than in *panguitchensis*. The maxillary tooth rows (alveolar) average greater in length in *cinderensis*. Compared with *cupidineus* from Kane County, *cinderensis* is much darker, smaller and has a shorter tail and a smaller skull with smaller bullae. Compared with *utahensis* topotypes, this new subspecies is smaller and has a shorter tail, a shorter diastema, more attenuate and less truncate ascending arms of supra-occipital and is darker in color. Compared with topotypes of *celeripes* from Trout Creek, Juab County, this race is larger, has a longer tail, but averages slightly smaller in most cranial measurements and is very much darker in color. Compared with *longipes* from southeastern Utah, this race is darker in color, slightly smaller, has shorter skull and shorter nasals, is narrower in interorbital width, has smaller bullae but a wider supra-occipital posterior to the interparietal.

Remarks.—The low Virgin Valley to the south and the Pine Valley

Mountains and the rough, rocky Zion Canyon area to the southeast of Diamond Valley separate *cinderensis* from *cupidineus*. The high Parowan (or Cedar) Mountains rising from 9,000 to 11,300 feet separate *cinderensis* from the similarly colored cinder-inhabiting *panguitchensis* on the east. If *cinderensis* and *panguitchensis* do intergrade, it would of necessity be through the lower desert areas north and northwest of these mountains.

A series of nine specimens from about six miles west of Parowan and directly south of Little Salt Lake are variable in color but lighter than either *cinderensis* or *panguitchensis*. However, they have dark-colored ears and are otherwise darker than *fetusus*. In total length they average almost the same as *panguitchensis* but in tail length and foot size are nearer *fetusus*. In cranial characters, they seem to be intergrades between *fetusus* and *cinderensis*. They could be as easily referred to one race as to another but are tentatively placed with *cinderensis*.

A series of 50 (including 5 juvenile) kangaroo-rats all taken the same night on the brown sand dunes of the Escalante Desert, 11 miles southeast of Lund, Iron County, are even more variable than the above series from near Parowan. The series of 45 adults contains individuals some of which are even lighter than *fetusus* and others as dark as *cinderensis*. Most of these have the black ears and dark markings of *cinderensis*.

In the total length they average only slightly more than either *cinderensis* or *fetusus* but have the short tail of *cinderensis*. These animals are considered as intergrades between these races but are tentatively placed with *cinderensis*.

Specimens examined.—Utah. Total number 71, as follows: *Washington County*.—From type locality at Diamond Valley (altitude about 4,000 feet), 10; from north of Mountain Meadows, $\frac{1}{2}$ mile within the Great Basin Drainage, 2. *Iron County*.—Escalante Desert, 11 miles southeast of Lund, 50; 6 miles west of Parowan, 9.

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

SOME TURRID MOLLUSKS OF MONTEREY BAY
AND VICINITY.

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Dr. Allyn G. Smith, Research Associate, California Academy of Sciences, and Mr. Mackenzie Gordon are preparing a report on the mollusk fauna of Monterey Bay and vicinity, and Dr. Smith has asked me to look over their list of turrids and prepare comments thereon. In order to render his list complete and in conformity with the monograph I am preparing on the West American turrid fauna, it becomes necessary to describe a number of superspecific groups as well as species, which is here done.

The new species here described will be figured in the monograph.

***Antiplanes profundicola*, new species.**

Shell of medium size, rather stout in comparison to its height, sinistral, covered with a thin olivaceous periostracum. Nuclear whorls eroded. The postnuclear whorls are inflated, strongly rounded, and marked by decidedly sigmoid incremental lines which follow the outline of the very deeply incised broad posterior sinus. In addition to this, the whorls are marked by slender, retractively curved, dendritic threads which radiate obliquely, retractively from the middle of the turns both anteriorly and posteriorly. The anterior half of the whorls also bears feebly incised spiral threads. Suture very strongly constricted. Base rather short, well rounded. Columella moderately long and stout. The base and columella are both marked by the continuations of the incremental lines and spiral threads, the latter become stronger on the columella. The right outline of the base and columella is decidedly concave. Aperture large. Anterior canal broad and short. Outer lip thin, protracted

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anterior to the sinus; inner lip decidedly sigmoid, reflected over and appressed to the base and columella.

The type, U. S. N. M. No. 209128, was dredged by the U. S. Bureau of Fisheries steamer *Albatross* at station 4352 off Point Loma Lighthouse, California, in 549–585 fms. on green mud bottom; bottom temperature, 39° F. It has 7 whorls remaining and measures: Height, 26.7 mm.; greater diameter, 10.4 mm.

U. S. N. M. No. 266861 contains 2 specimens dredged by the *Albatross* at station 5699, off Point Sur Light, lat. 36° 0' 30" N., long. 122° W., in 659 fms., on green mud bottom; bottom temperature, 37.9° F.

U. S. N. M. No. 209320 contains 1 specimen dredged by the *Albatross* at station 4425, off San Nicolas Island in 1100–1084 fms., on green mud, fine sand and globigerina bottom.

U. S. N. M. No. 266835 contains 2 specimens dredged by the *Albatross* at station 5694 off San Nicolas Island, lat. 33° 24' 36" N., long. 120° 12' 30" W., in 640 fms. on green mud bottom.

U. S. N. M. No. 209084 contains 1 specimen dredged by the *Albatross* at station 4326 off Point La Jolla, California, in 243–292 fms. on soft green mud; bottom temperature, 44° F.

U. S. N. M. No. 214065 contains 2 specimens dredged by the *Albatross* at station 2923, off San Diego, lat. 32° 40' 30" N., long. 117° 31' 30" W., in 822 fms. on green mud bottom; bottom temperature, 39° F.

U. S. N. M. No. 208899 contains 2 specimens dredged by the *Albatross* at station 4382, off North Coronado Island in 656 fms. on green mud bottom; bottom temperature, 42.5° F.

The short stout form will readily distinguish this species from the other members of the region.

***Antiplanes diomedea*, new species.**

Shell moderately large, turritid, sinistral, covered with a thin olivaceous periostracum. Nuclear whorls eroded. The postnuclear whorls are inflated, strongly rounded, slopingly shouldered, and marked by rather strong sinuous incremental lines which follow the outline of the posterior sinus. In addition to this, they are marked by weak, oblique, dendritic markings. Suture very strongly constricted. Base of the last whorl moderately rounded, moderately long. The columella is rather stout, moderately long, somewhat twisted, and marked by the continuation of the incremental lines. Aperture short, very broad and large. Outer lip thin with a broadly incised posterior sinus anterior to which it is protracted. The inner lip is sinuous and reflected over the columella as a thick callus. The anterior canal is short and broad.

The type, U. S. N. M. No. 212294, was dredged by the U. S. Bureau of Fisheries steamer *Albatross* at station 3186 off Point Sur, California, lat. 36° 18' 50" N., long. 122° 6' W., in 328 fms. on black sand and mud bottom; bottom temperature, 41.3° F. It has 6.8 whorls remaining and measures: Height, 40.2 mm.; greater diameter, 15.8 mm.

This somewhat resembles *Antiplanes profundicola* but is ever so much larger.

RECTIPLANES, new genus.

Shell elongate-conic, dextral, covered with a moderately strong periostracum. Nuclear whorls a little more than 1.5, somewhat inflated, forming a slightly expanded apex; the first smooth and the last marked only by fine incremental lines. Postnuclear whorls appressed or narrowly shouldered at the summit and marked by decidedly sigmoid lines of growth which follow the outline of the posterior sinus. The spiral sculpture may be absent or consist of threads of varying strength in the different species. In addition, weak dendritic, retractively oblique lines radiating from the posterior sinal line may be present, or, in some species deeply impressed oblique lines may roughen the surface. Aperture more or less elongate pear-shaped, decidedly channeled anteriorly with a deep sinus a little anterior to the summit on the outer lip; the portion anterior to this sinus is protracted into a slightly clawlike element; inner lip decidedly sigmoid, covered with a rather thick callus which extends over the parietal wall. Operculum narrow, claw-shaped with apical nucleus and strong, concentric incremental lines.

The animal of *R. santarosana* has very broad conic tentacles with prominent eyes placed on a little swelling on the outer basal margin. The radula has a narrow, decidedly reduced, rachidian tooth bordered by Y-shaped marginals. The males of *R. santarosana* are provided with a large verge on the right side.

Type: *Rectiplanes santarosana* (Dall) = *Pleurotoma* (*Antiplanes*) *santarosana* Dall.

RHODOPETOMA, new genus.

Shell of medium size, covered by a moderately thick periostracum. (Nuclear whorls decollated in our material.) Postnuclear whorls with a broad low cord at the summit followed anteriorly by a slightly concave area, which constitutes the sinal region. The anterior half of the whorls is marked by axial ribs which evanesce on the last turn. In addition to this, the whorls are marked by microscopic spiral lines in the sinal region and spiral threads on the ribbed portion. Suture strongly constricted. Base moderately long, marked by low, weakly developed spiral threads and incremental lines. This type of sculpture also extends over the columella. Aperture moderately large and broad; outer lip with a deep broad sinus a little below the summit. Anterior to the sinus the outer lip is protracted. The anterior channel is short and broad; the inner lip is sinuous and reflected over the columella as a callus which extends over the parietal wall. Operculum very small, lanceolate, with apical nucleus, marked on the outside by concentric lines of growth. The apical fifth of the operculum appears free on the inside and the muscle scar is deeply impressed. The radula of *Rhodopetoma rhodope* consists of a small rachidian and Y-shaped marginals.

To this genus belong the genotype *Rhodopetoma rhodope* Dall (= *Borsonnella rhodope* Dall, Proc. U. S. Nat. Mus., vol. 56, p. 39, pl. 12, fig. 3) and *Rhodopetoma amycus* Dall, Proc. U. S. Nat. Mus., vol. 56, p. 36, pl. 11, fig. 5.

CARINOTURRIS, new genus.

Shell varying from small to medium sized, and in shape from ovate to elongate-conic, covered with a thin periostracum. The nuclear whorls are practically always eroded. One specimen, however, indicates that the nucleus consists of a single smooth rounded whorl. The postnuclear whorls bear a weak median spiral keel; finer spiral sculpture may be present on the spire or base. The left outline of the base and columella is concave, and the suture is strongly constricted. The aperture is elongate-pyriform with the anterior canal rather long and rather broad. The posterior sinus falls on the shoulder of the turns or is immediately anterior to the summit. The outer lip is protracted anterior to the sinus; inner lip reflected over the columella, and the parietal wall covered with a glazed callus. The operculum is small compared to the size of the aperture and broadly ovate with apical nucleus and marked on the outside by concentric lines of growth. The radula has Y-shaped marginals only. The animal appears to be blind.

Type: *Carinoturris adrastia* Dall (= *Cryptogemma adrastia* Dall).

The shell of this genus suggests *Spirotropis*, but the radula is entirely different, *Spirotropis* having rachidian, lateral and marginal teeth.

Carinoturris fortis, new species.

Shell large, elongate-conic, covered with a grayish olivaceous periostracum. Nuclear whorls decollated. The postnuclear whorls have a weak median spiral cord. Anterior to this they curve convexly to the slightly shouldered summit. This area is marked by retractively curved incremental lines only. The anterior half of the last whorl and base are inflated, strongly rounded, and marked by strong incremental lines which vary in strength and almost give to the base an obscurely ribbed aspect. Columella rather stout, moderately long, twisted. The left outline of the base and columella is moderately concave. Aperture elongate pear-shaped with the anterior canal moderately long and rather broad. The posterior sinus is broad and extends from the summit to the median cord. Anterior to this the outer lip is protracted. The inner lip is obliquely truncated, free for about two-fifths of its basal length. The posterior portion appears on the columella as a smooth resorption area which also extends over the parietal wall.

The type, U. S. N. M. No. 212323, was dredged by the U. S. Bureau of Fisheries steamer *Albatross* at station 3187 off Point Sur, California, in 298 fms., on yellow sand and mud bottom; bottom temperature, 41.1° F. It has 5 whorls remaining and measures: Height, 16 mm.; greater diameter, 7 mm.; length of aperture, 8.9 mm.

It is easily distinguished from *C. adrastia* Dall by having a much longer aperture and the spiral keel much less developed.

Megasurcula granti, new species.

?1906. *Pleurotoma* (*Genota*) *carpenteriana* Raymond, *Nautilus*, vol. 20, pl. 2, fig. 3.

Shell very large, spindle-shaped, of dingy yellowish ground color with the spiral bands on the last whorl chestnut brown. Nuclear whorls about 2, small, well rounded, smooth. The early postnuclear whorls show the sinal depression. Beginning with about the third postnuclear whorl, the weak nodules at the anterior termination of the sinal area make their appearance. These extend over about 1.5 whorls, about 14 being present. On the succeeding turns the nodulations disappear. The sinal area on the last whorl is concave and the rest of the whorl, base, and columella are convex. The outline of the base and columella on the left side is concave. The last two whorls are marked by very fine spiral lirations on the sinal area and little coarser threads anterior to this which gradually become stronger on the base. Here the moderately strong spiral threads are separated by three or four more slender threads, the heavier ones corresponding to the dark lines. The axial sculpture consists of rather rough incremental lines. There is a strong basal fasciole, which is marked by more or less concentric rough rugations. Aperture large, oval. Posterior sinus of the outer lip broad and shallow. Anterior to the posterior sinus the outer lip is protracted. The inner lip shows decided resorption on the columella which also extends up on the parietal wall.

The type, U. S. N. M. No. 55227, comes from the Stearns Collection and was collected in Monterey Bay. It has 7.6 whorls remaining and measures: Height, 99.8 mm.; greater diameter, 38.7 mm.; length of aperture, 58.2 mm.

U. S. N. M. No. 517957 contains 2 specimens from San Pedro, California, received from John Howard Paine.

U. S. N. M. No. 523713 contains another specimen from the Casey Collection marked simply "California."

This species belongs to the nodulose group of *Megasurcula*, i. e., *M. tryoniana* Gabb, *M. cooperi* Arnold, *M. keepi* Arnold, and *M. tremperiana* Dall. It differs from the first three in having the nodulations pronounced only on the early postnuclear whorls and absent on the last, and from *tremperiana* by its much larger size.

OPHIODERMELLA, new genus.

Shell rather large, regularly conic, with the first 2 nuclear whorls smooth and well rounded. The succeeding turns gradually develop the postnuclear sculpture. The postnuclear whorls bear axial riblets which assume a sigmoid trend (these vary materially in strength in the different species). In addition to this axial sculpture numerous fine incremental lines are present. The spiral sculpture consists of low cords and fine spiral striations. The base is usually marked with a little more intense sculpture, while on the columella it again becomes decidedly enfeebled. The columella bears a weak basal fasciole. The aperture is moderately long and moderately broad. The posterior sinus is moderately deeply incised, the deepest portion falling a little posterior to the middle of the turns. Anterior canal moderately long. The inner lip

is sigmoid. The operculum is quite small, ovate, with apical nucleus and concentric lines of growth. The radula bears marginal teeth only which resemble a long slender curved awl.

Type: *Ophiidermella ophioderma* (Dall). (= *Pleurotoma ophioderma* = *Pleurotoma inermis* Hinds 1844 not Partsch 1843.)

Dall, in his "Summary of marine shell-bearing Mollusks of the Northwest Coast of America, * * *", Bulletin 112, U. S. National Museum, lists the members of this genus under the name *Moniliopsis* Conrad.

While superficially the species included in the new genus resemble *Moniliopsis*, other structures point to a wide separation. *Moniliopsis* has three smooth nuclear turns followed by an axially ribbed stage which in turn is succeeded by the postnuclear sculpture. Also, the columella of *Moniliopsis* is straight, not sigmoid as in the present genus. These are good and sufficient characters for the separation.

Moniliopsis was based on *Pleurotoma elaborata* Conrad, which comes from Claiborne, that is, the Middle Eocene of Alabama.

This genus in addition to the type species which ranges from San Pedro to Lower California, includes *O. incisa* (Carpenter) which comes from the Puget Sound region and *O. halcyonis* Dall of San Pedro to San Diego region, as well as the new species here described from Monterey Bay.

***Ophiidermella montereyensis*, new species.**

Shell small, elongate-turrit, reddish horn colored with the inside of the outer lip a little paler. The nucleus consists of 2 small smooth turns which pass into the postnuclear sculpture. The postnuclear whorls are moderately rounded and marked by sigmoid axial ribs which are not quite as wide as the spaces that separate them, and spiral threads about as wide as the axial ribs. The combination of these two elements lends to the whorls a somewhat fenestrated appearance. Periphery slightly angulated. Base moderately well rounded and marked like the spire. The columella is rather slender, sigmoid and marked by spiral cords which are more distantly spaced than those on the spire and base. Aperture elongate pear-shaped with the deepest incision of the moderately profound posterior sinus about two-thirds of the distance between the summit and the suture, anterior to the summit. Anterior to the posterior sinus the outer lip is protracted. The inner lip is sinuous and bears a shining resorption area on the columella, which also extends over the parietal wall.

The type, U. S. N. M. No. 214251, was dredged by the U. S. Bureau of Fisheries steamer *Albatross* at station 3134 in Monterey Bay, California, in 13 fathoms, on fine sand and mud bottom; bottom temperature, 54.5° F. It has a little more than 9 whorls, having lost a fraction of the first turn, and measures: Height, 18 mm.; greater diameter, 6 mm.

U. S. N. M. No. 206543 contains another specimen dredged by the *Albatross* in Monterey Bay at station 3142 in 13 fms. on sand and rock bottom.

U. S. N. M. No. 206537 contains another specimen dredged by the *Albatross* in Monterey Bay at station 3138 in 19 fms. on sand and mud and stone bottom. In its type of sculpture the species most nearly resembles *O. haleyonis*, but it differs from that in having much more numerous axial riblets and in being smaller.

***Borsonella pinosensis*, new species.**

Shell rather large, elongate-turritid, covered with a pale olivaceous periostracum. Nuclear whorls decollated in all our specimens. The postnuclear whorls are moderately well rounded, appressed at the summit with the posterior sinistral area slightly impressed, extending from the summit to about two-thirds of the distance between the summit and the periphery. The whorls are marked by irregularly developed, closely spaced incremental lines which assume almost the strength of riblets. In addition to this, feeble incised spiral lines are present which are best developed on the posterior half of the turns. There are also certain crisscross markings present. Base well rounded and marked like the spire. Columella stout with a narrow umbilical chink at the anterior portion. The columella is marked by the continuation of the axial sculpture. Aperture elongate pear-shaped. The posterior sinus falls immediately below the summit and is broad and moderately deep. Anterior to the posterior sinus the outer lip is protracted into a clawlike element. The inner lip is thick and reflected over the columella and bears an obscure fold a little anterior to its insertion. The parietal wall is covered by a moderately thick callus.

The type, U. S. N. M. No. 210634, was dredged by the U. S. Bureau of Fisheries steamer *Albatross* at station 4452 in 49–50 fms. off Point Pinos Light on mud and sand bottom. It has 7 whorls remaining and measures: Height, 27.2 mm.; greater diameter, 9.5 mm.

U. S. N. M. No. 209843 contains a topotype from the same station.

U. S. N. M. No. 210048 contains a specimen dredged by the *Albatross* at station 4457 in 40–46 fms. off Point Pinos Light on mud bottom.

This species seems to have been confused with *Borsonella dalli* Arnold from the Pleistocene of Deadman's Island, but the strong angulation of the whorls of *dalli* will readily distinguish it from the present species.

KURTZIA, new genus.

Shell small, elongate-conic. The nucleus consists of 1.5 smooth turns followed by a fraction of a whorl that shows a couple of weak, rounded, flattened spiral threads. This is succeeded by 2 turns having strongly developed axial ribs which are protractively curved and narrower than the spaces that separate them, and 2 spiral cords, one of which forms the strong median angle, while the other is located halfway between this and the suture. The postnuclear whorls have a very conspicuous elevated, almost median shoulder and are crossed by very strong axial ribs which taper from the shoulder to the summit, as well as anteriorly; anteriorly they pass over the base and part of the columella. In addition to this,

there are finer axial threads between the ribs and on them, which extend from the summit to the tip of the columella. The spiral sculpture in addition to the median cord consists of similar cords, usually weaker, more or less regularly spaced from the median cord to the columella, growing gradually less strong anteriorly. These cords in connection with the axial ribs produce a fenestrated pattern. Between these spiral cords and upon them are finer spiral threads about as strong as the finer axial threads. These, in crossing each other, produce slender granulations that give to the entire surface of the shell a finely granular appearance. Aperture narrowly elongate-ovate with the posterior sinus moderately deep, extending from the summit to the median keel. Anterior to this the outer lip is protracted. The anterior canal is moderately long and moderately broad, and the inner lip appears as a glazed area upon the columella which extends upon the parietal wall. The operculum is thin, oval with apical nucleus and concentric lines of growth. The radula bears dagger-shaped marginals only.

Type: *Kurtzia arteaga* Dall and Bartsch. (= *Mangilia arteaga* Dall and Bartsch 1910.)

The decidedly longer postnuclear whorls will at once distinguish this from typical *Kurtziella*.

This genus embraces a number of species on the West Coast and ranges from British Columbia south to Panama.

KURTZINA, new genus.

Shell very small, varying from ovate to elongate-conic. The nucleus forms a rather obtuse apex. It consists of 2 strongly rounded, smooth turns, succeeded by a stage in which the axial ribs and spiral threads are of about the same strength, their intersections being nodulose. The postnuclear whorls are strongly medially angulated. Anterior and posterior to the angle they bear spiral cords of equal strength, which are finely granulose. This type of sculpture also extends over the base and columella. The axial sculpture consists of strong vertical or protractively slanting ribs which extend from the summit to the columella. Between these stronger ribs are incremental lines which are responsible for the granulation of the spiral threads. Base well rounded. Columella moderately long, slender, and slightly twisted. Aperture oval. The posterior sinus is immediately below the summit, extending from that to the median angulation. Anterior to the posterior sinus the outer lip is protracted. The parietal wall is covered with a glazed callus. The operculum is narrow, slender, and marked by concentric lines of growth. The radula bears dagger-shaped marginals only.

Type: *Kurtzina beata* (Dall) (= *Mangilia* (*Kurtziella*) *beata* Dall).

This genus differs from *Kurtzia* in having all the spiral threads of uniform strength instead of having coarse and finer elements. The group embraces a number of species and extends on the west coast from California to the Gulf of California.

Kurtzia gordonii, new species.

Shell small, very elongate-conic, wax colored. The nucleus consists of an initial stage of 1.5 smooth turns followed by a fraction of a whorl that shows a couple of weak, rounded, flattened spiral threads. This is succeeded by 2 turns having strongly developed axial ribs which are protractively curved and narrower than the spaces that separate them, and 2 spiral cords, one of which forms the strong median angle, while the other is located halfway between this and the suture. The postnuclear whorls are strongly angulated in the middle with the gently sloping shoulder posterior to this. They are marked by almost vertical axial ribs, of which 9 are present on the penultimate and the last turn. These ribs are very strong and about half as wide as the spaces that separate them. The spiral sculpture consists of a strong cord on the middle of the turns which marks the angulation, and a lesser cord midway between this and the periphery, the periphery being marked by another strong cord. Between the summit and the median angulation, 13 slender rounded spiral threads are present, 3 additional ones occurring on the cord at the angle, while the space between this and the cord anterior to it is marked by 7 similar threads; the cord itself also bears 3 threads and the space between this and the sutural cord bears 8 spiral threads with 3 additional threads on the peripheral cord. These cords are rendered minutely nodulose by the axial threads which are about as wide as the spaces that separate them. The nodules are very regular and rounded and give to the surface of the whorls a finely granulated appearance. Base rather long and marked by 4 spiral cords about half as strong as those on the spire between which finely granulose spiral threads are present. Of these, 6 are present between the periphery and first cord, 5 between that and the second cord, and 4 between that and the third cord. The columella is slender, slightly twisted and bears spiral cords which become consecutively weaker from the insertion to the tip of the columella. Nine of these spiral cords are present, and between them finely granulose threads. The fine nodules of spire, base, and columella are of similar strength and give that finer sculpture a quite uniform aspect. Aperture elongate-ovate. The outer lip with the posterior sinus between the summit and the median angulation. This is rather deep and rounded. Anterior to the sinus the outer lip is protracted and rendered sinuous by the heavier spiral sculpture. Anterior canal moderately broad and moderately long. The inner lip appears on the columella as a resorption area which extends up on the parietal wall. The operculum is thin, oval with apical nucleus and concentric lines of growth. The radula bears dagger-shaped marginals only.

The type, U. S. N. M. No. 331115, was dredged by the U. S. Bureau of Fisheries steamer *Albatross* at station 4482 in 43-46 fms. on green mud bottom, off Santa Cruz, California. It has 7 postnuclear whorls remaining and measures: Height, 10 mm.; greater diameter, 3.5 mm.

U. S. N. M. No. 538882 contains 3 topotypes from the same source.

U. S. N. M. No. 331147 contains 3 specimens dredged by the *Albatross*

at station 4483 in 45 fms. on green mud bottom, off Santa Cruz, California.

U. S. N. M. No. 323521 contains 2 specimens dredged by the *Albatross* at station 4464 in 51 fms. on mud bottom, in Monterey Bay.

U. S. N. M. No. 209356 contains 1 specimen dredged by the *Albatross* at station 4475 in 142-158 fms., off Point Pinos Light.

U. S. N. M. No. 209871 contains 3 specimens dredged by the *Albatross* at station 4457 in 40-46 fms. off Point Pinos Light.

U. S. N. M. No. 150568 contains 1 specimen from Santa Barbara.

U. S. N. M. No. 206195 contains 2 additional specimens from Santa Barbara Island.

This species was referred to *Mangelia arteaga roperi* Dall by Dall, but is sufficiently distinct to merit specific separation. It is much larger than *roperi* with a much more acutely sloping shoulder and much shorter aperture.

I take pleasure in naming this species for Mackenzie Gordon in recognition of his work in the Monterey Bay region.

***Propebela (Turritoma) diomedea*, new species.**

Shell small, thin, ovate, yellowish white. Nuclear whorls decollated. The postnuclear whorls are strongly rounded with a decided angulation at the anterior limit of the posterior sinus. The postnuclear whorls are marked by strong, protractively slanting axial ribs which are about half as wide as the spaces that separate them. Of these ribs, 18 are present on the last turn and 15 on the preceding whorl. The spiral sculpture consists of fine incised lines on the shoulder of the turns, that is the sinal area. The shoulder is marked by a spiral cord that renders the axial ribs very strongly nodulose. Anterior to the shoulder, the whorls are marked by strong spiral cords of which 2 are present on the first remaining turn, 3 on the second, and 4 on the third and last turns. Base strongly rounded and marked by the feeble continuations of the axial ribs and 8 spiral threads which become slightly weaker toward the columella. The columella is slender, slightly concave on the left side, and marked by 17 spiral threads. The aperture is pear-shaped. The posterior sinus is moderately deep. Anterior to the posterior sinus the outer lip is protracted and slightly concave on the basal portion. The inner lip is appressed to the columella which it marks as a slight absorption area that extends over the parietal wall.

The type, U. S. N. M. No. 226159, was dredged by the U. S. Bureau of Fisheries steamer *Albatross* at station 3670 in 581 fms. in Monterey Bay on mud bottom. It has 4.5 whorls remaining and measures: Height, 9.9 mm.; greater diameter, 5 mm.

U. S. N. M. No. 538878 contains 3 topotypes from the same source.

It differs from *P. (T.) monterialis* Dall in being much shorter, stouter, with more angulated shoulder and in having more distantly spaced ribs.

***Propebela (Turritoma) profundicola*, new species**

Shell moderately large, elongate-ovate, yellowish white. Nuclear whorls decollated. The postnuclear whorls are well rounded and bear a moderately strong angulation at the anterior termination of the posterior sinal area. The last postnuclear whorl bears 14 broad heavy axial ribs which are not quite as wide as the spaces that separate them. The preceding turn has 11 ribs. The spiral sculpture consists of 6 slender spiral threads in the sinal area, while at the angulation a heavier cord is present which renders the axial ribs nodulose. The space between the angulation and the suture bears 5 low spiral cords between which finer spiral threads are present. The base is moderately long, well rounded, and marked by the continuation of the axial ribs and 15 spiral threads, between which and on which finer spiral striations are present. The columella is moderately long and marked by feeble spiral threads. Aperture pear-shaped. The posterior sinus extends from the summit to the angulation and is shallow. Anterior to the posterior sinus the outer lip is protracted. The inner lip is reflected over the columella as a smooth area which extends over the parietal wall.

The type, U. S. N. M. No. 274112, was dredged by the U. S. Bureau of Fisheries steamer *Albatross* at station 4538 in 871 fms. on gray sand and rock bottom, off Point Pinos Light. It has 4 whorls remaining and measures: Height, 13.3 mm.; greater diameter, 6.2 mm.

This species is much larger than *Propebela (Turritoma) diomedea*, with the axial ribs coarser, heavier and even more distantly spaced, while the nodulation of the shoulders of the whorls is much less strong.

***Propebela (Turritoma) smithi*, new species.**

Shell moderately large, elongate-ovate, thin, yellowish white. Nuclear whorls decollated. The postnuclear whorls are well rounded. They are slightly channeled at the summit and roundly shouldered at the angulation, which is two-fifths of the distance between the summit and the suture, anterior to the summit. They are marked by slender, somewhat sinuous, protractively slanting, axial riblets which are best developed on the middle turns. On the last 1.5 turns they become gradually reduced and on the last portion of the last turn form mere incremental lines. The rounded shoulder forming the sinal area bears 6 slender spiral threads. Anterior to this, the whorls are marked by 9 stronger spiral cords which are separated by spaces about as wide as the spiral cords. On the last turn the spiral sculpture also becomes much reduced; 16 threads are here indicated. Base well rounded and marked by incremental lines and spiral threads a trifle stronger than those on the spire. Columella moderately stout, slightly concave on the left side, and marked by spiral threads of about the same strength as those on the base on its posterior half. On the anterior half the spiral markings become very fine. Aperture ovate. Posterior sinus immediately below the summit, moderately deep and rounded. Anterior to the posterior sinus the outer

lip is protracted. The inner lip is reflected over the columella as a thin callus which extends up on the parietal wall.

The type, U. S. N. M. No. 209118, was dredged by the U. S. Bureau of Fisheries steamer *Albatross* at station 4508 in 293-386 fms. off Point Pinos Light, on mud bottom. It has 5 whorls remaining and measures: Height, 9.5 mm.; greater diameter, 4.3 mm.

The fine axial ribs and fine spiral sculpture of the last 1.5 whorls will readily distinguish this species from the other here described.

I am naming it for Dr. Allyn G. Smith in appreciation of the work done by him in Monterey Bay.

PROCEEDINGS
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NEW CULICINE MOSQUITOES FROM THE
PHILIPPINE ISLANDS
(DIPTERA, CULICIDAE).¹

R. M. BOHART, LIEUTENANT (JG), H-V(S), USNR² AND
D. S. FARNER, LIEUTENANT (JG), H-V(S), USNR³

Through the courtesy of the Museum of Comparative Zoology at Harvard College, a collection of mosquitoes from Mt. Apo, Mindanao, was made available to the authors for study. This collection was found to contain a new species of *Armigeres*, two new species of *Tripteroides* and two male specimens of *Aedes* which agree closely with the description of *Aedes uncus* (Theobald). In the course of comparing this material with the collection of Philippine *Tripteroides* in the U. S. National Museum, an additional new species was found.

***Armigeres apoensis*, n. sp.**

Male.—Length 5.5 mm., wing 4.2 mm. Vertex with broad median area covered with dark brown broad appressed scales with median spot of whitish upright and broad appressed scales; eyes with a narrow border of pale broad appressed scales, broadening laterally into a pale area partially surrounding a smaller dark area. Torus with small whitish broad scales. Clypeus dark brown, bare. Palpus and proboscis dark and about equal in length. Scutum brown mostly covered with very slender brown scales. Slender to crescent-shaped pale scales forming narrow median line extending onto scutellum, posterior submedian lines, and border of white scales on margin of scutum anterior to wing bases (figure 11). Scutellum mostly with dark broad scales and with posterior extension of median pale line of scutum. Anterior pronotal lobe with whitish broad appressed scales, posterior pronotum with broad

¹ The authors wish to thank Dr. Alan Stone, Division of Insect Identification, U. S. Department of Agriculture, for his helpful suggestions and assistance.

² U. S. Naval Medical Research Unit No. 2.

³ Preventive Medicine Division, Bureau of Medicine and Surgery, Navy Department,

appressed and a few narrow curved whitish scales. Pleuron brown, with dense patches of whitish scales, postspiracular scales whitish only. Wing scales dark. Coxae with patches of whitish scales; each femur with ventral pale stripe, broadest on hind leg; tibiae and tarsi dark. Dorsum of abdomen dark, tergites with lateral basal pale area; venter mostly pale. Genitalia as in figure 15. Mesosome relatively broad and truncate apically; lobe of basistyle with three strong setae; dististyle broadened, sub-triangular, with 15-19 teeth.

Female.—Similar to male. Palpus slightly more than $\frac{1}{4}$ length of proboscis. Scutum with pale margin as in male (remainder of scutum mostly denuded).

Type.—Male, Sibulan River, 7000-8000 feet, Mt. Apo, Mindanao, Philippine Islands, September 23 (C. S. Clagg), in Museum of Comparative Zoology.

Paratypes.—13 ♂♂, 1 ♀, same locality and collector as type, August 30–September 23, Museum of Comparative Zoology and U. S. National Museum.

This species seems to be closely related to *aurolineatus* Leicester and *manalangi* Baisas in that all three have a broadened trianguloid dististyle and three setae on the inner median lobe of the basistyle. The diagnostic differences can be outlined as follows:

*A. aurolineatus*⁴—(1) Basistyle with inner apical tuft of thickened hairs, (2) single bristle on outer margin of dististyle, (3) three slender setae on inner median lobe of basistyle, (4) mesosome apically with two outwardly directed prongs, (5) scutum with anterior submedian lines and posterior sublateral lines.

A. apoensis—(1) Basistyle with no definite inner apical tuft of thickened hairs, (2) five bristles on outer margin of dististyle, (3) three stout setae on inner median lobe of basistyle (figure 15), (4) mesosome broadly rounded or truncate apically and with border of tooth-like projections (figure 15), (5) scutum with median line and posterior sublateral lines (figure 11).

*A. manalangi*⁵—(1) Basistyle with no definite inner apical tuft of thickened hairs but with dense tuft of hairs along inner apical half, (2) five bristles on outer margin of dististyle, (3) three moderately stout setae on inner median lobe of basistyle, (4) mesosome narrowly rounded apically and with border of tooth-like projections, (5) scutum apparently without median, submedian, or sublateral lines. (Baisas described no such lines from his reared type material.)

Tripteroides antennalis, n. sp.

Male.—Vertex with dark broad appressed scales, iridescent dark blue in anterior view and with extreme lateral pale spot; a row of upright dark scales on anterior margin of nape. Torus bare; flagellum with about 30-40 hairs per segment on first six segments; the basal five seg-

⁴ From examination of a series of 2 ♀♀, 2 ♂♂, Sarawak, Borneo (determined by F.W. Edwards, 1928).

⁵ According to F. E. Baisas (1935), Philippine Journal of Science, vol. 56, p. 492.

ments distinctly shortened and thickened; some of the hairs of the basal six segments shortened and apically curled, forming a dense inner tuft; many of the other hairs curled apically (figure 10). Proboscis and palpus dark; proboscis almost $1\frac{1}{3}$ length of front femur, basal $\frac{2}{5}$ strongly depressed; palpus about length of clypeus. Scutum with brown integument, paler laterally, and with dark hairlike scales. Scutellum with dark slightly iridescent broad appressed scales. Postnotum dark brown, bare. Anterior pronotal lobe with dark broad appressed scales, posterior pronotum with yellowish brown integument and dark hairlike scales. Pleuron dark brown, with scattered areas of silvery scales. Wing scales dark. Coxae with silvery patches; front femur dorsally with basal streak and two silvery spots on apical half; mid and hind femora similar but without basal streak; tibiae and tarsi dark; front tarsal claws simple. Abdominal tergites with very dark scales and small apical lateral silvery spots. Genitalia as in figures 2 and 14.

Type.—Male, Sibulan River, 7000-8000 feet, Mt. Apo, Mindanao, Philippine Islands, September 25 (C. S. Clagg), in Museum of Comparative Zoology. This species differs from all known species of *Tripteroides* in its peculiar antenna (figure 10). Although distinctly different from other Philippine species, it resembles *powelli* (Ludlow) in the spotted femora and dark postnotum. *T. antennalis* differs from it, however, in the darker blue vertex and the smaller silvery abdominal spots.

Tripteroides claggi, n. sp.

Male.—Length about 3.5 mm., wing 3 mm. Anterior half of vertex covered with white broad appressed scales, iridescent blue from anterior view; posterior half of vertex dark with some erect scales. Torus bare, flagellum with about 8-10 long hairs per segment. Palpus and proboscis dark, proboscis $1\frac{1}{3}$ length of front femur, palpus twice the length of clypeus. Scutum with dark brown integument (mostly denuded); scales, at least on anterior margin, yellowish. Scutellum with dark iridescent broad appressed scales. Postnotum bare or denuded. Anterior pronotal lobe with iridescent bluish broad appressed scales, posterior pronotum with dull whitish broad appressed scales. Pleuron mahogany brown, with patches of silvery translucent scales. Wing scales dark. Coxae with silvery patches, femora pale ventrally with indications of pale spots, tibiae and tarsi dark, larger front tarsal claw with tooth at apical third. Abdomen clothed with very dark scales. Genitalia as in figures 5 and 13.

Type.—Male, Sibulan River, 7000-8000 feet, Mt. Apo, Mindanao, Philippine Islands, August 31 (C. S. Clagg), in Museum of Comparative Zoology.

This species appears to be closely related to *similis* (Leicester) from Malaya and India but differs from it in having iridescent blue scales on the anterior pronotal lobes, in the ornamentation of the vertex, the presence of minute bristles over the entire length of the dististyle, and in the greater length of the lobes of the ninth tergite. It is the only

known Philippine *Tripteroides* with the anterior half of the vertex with white scales.

***Tripteroides dyari*, n. sp.**

Rachionotomyia monetifera Dyar 1920 (♂ only). *Insecutor Inscitiae* Menstruus, vol. 8, p. 176.

Rachionotomyia powelli Ludlow, Dyar 1925 (in part). *Insecutor Inscitiae* Menstruus, vol. 13, p. 72.

Male.—Length about 3.0 mm., wing 2.2 mm. Vertex mainly clothed with iridescent light blue broad appressed scales, posteriorly with dark appressed and dark upright scales, and laterally with patch of whitish scales. Torus bare, flagellum with about 10 long hairs per segment. Proboscis and palpus brown, proboscis 1-1/2 length of front femur, palpus about twice length of clypeus. Integument of entire thorax yellowish brown. Scutum and posterior pronotum with dark hairlike scales. Scutellum with iridescent broad appressed scales. Postnotum bare. Anterior pronotal lobe with dark broad appressed scales. A large silvery triangular patch on sternopleuron, scattered translucent scales on mesepimeron. Wing scales dark. Coxae with silvery patches; femora dorsally with basal streak and two silvery spots on apical half, less distinct on hind legs; tibiae and tarsi dark. Abdominal tergites with very dark scales and transverse lateral apical silvery spots. Genitalia as in figures 3 and 12.

Type.—Male (U. S. National Museum No. 57106), Los Banos, Laguna, Luzon, Philippine Islands.

The type specimen of this species was originally designated by Dyar as one of the three type specimens of *monetifera*. However, in 1925 he pointed out that it differed from *monetifera* and identified it as *powelli*. Actually, it is specifically distinct, differing from *powelli* in that it lacks the mahogany markings of the pleuron of *powelli*, and from *monetifera* in having the scales of the anterior pronotal lobes dark instead of opalescent as in *monetifera*.

Of the two type females of *monetifera* in the U. S. National Museum, the perfect specimen (the other is headless) is herein designated as the lectotype.

EXPLANATION OF PLATE

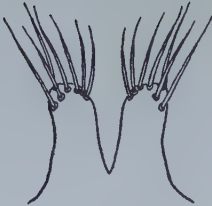
Figs. 1-6, ninth tergite of male *Tripteroides*. Fig. 1, *powelli* (Ludlow); fig. 2, *antennalis* n. sp.; fig. 3, *dyari* n. sp.; fig. 4, *microcala* (Dyar); fig. 5, *claggi* n. sp.; fig. 6, *nepenthicola* (Banks). Figs. 7-9, dististyle of male genitalia of *Tripteroides*. Fig. 7, *powelli*; fig. 8, *microcala*; fig. 9, *nepenthicola*. Fig. 10, *Tripteroides antennalis*; male, inner view of basal six flagellar segments of left antenna. Fig. 11, *Armigeres apoensis* n. sp., dorsal view of scutum. Figs. 12-14, male genitalia of *Tripteroides*, right side, ventral view. Fig. 12, *dyari*; fig. 13, *claggi*; fig. 14, *antennalis*. Fig. 15, *Armigeres apoensis*, ventral view of right side of male genitalia, and dististyle enlarged.



1.powelli



2.antennalis



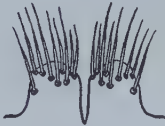
3.dyari



4.microcala



5.claggi



6.nepenthicola



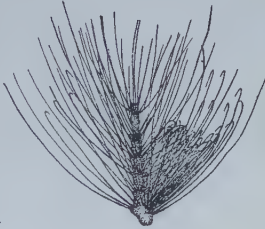
7.powelli



8.microcala



9.nepenthicola



10.antennalis



11.apoensis



12.dyari



13.claggi



14.antennalis



15.apoensis

RMB

PROCEEDINGS
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A NEW MACAQUE FROM AN ISLAND OFF THE
EAST COAST OF BORNEO

By REMINGTON KELLOGG.¹

Among the Bornean mammals collected for the United States National Museum by the late Harry C. Raven are four specimens of a long-tailed macaque which is an insular representative of the well known Malaysian *Macaca irus*.

Macaca irus tua, subsp. nov.

Type locality.—Poelau Marathea [=Pulo Muara Tua], an island off the east coast of Borneo.

Type specimen.—Male adult, skin and skull; No. 197663, U. S. National Museum; collected May 21, 1913, by Harry C. Raven; original number 626.

Distribution.—Known only from the type locality.

General characters.—Resembling *Macaca irus umbrosa* and *M. irus fusca* in the blackish-brown coloration of upperparts, but head is somewhat lighter and the long hairs below ear on hinder part of cheek are near pale drab-gray instead of hair-brown. Hair growth on top of head unlike that of *umbrosa* and *fusca*. Differs from *irus (mandibularis)* from the mainland of Borneo in the conspicuously darker coloration, with no trace of tawny on upperparts and outer surfaces of limbs, and although the hair growth on the head is somewhat similar in both, the race on Poelau Marathea has conspicuously longer hair.

Color.—*Type*: Ground color of upperparts and outer surfaces of fore and hind limbs blackish-brown (near clove-brown), each hair light drab at base with a cream or live-buff annulation 2 to 3 mm. in width near tip; hairs on forepart of crown short, with cinnamon-buff annulation below black tip, and bordered anteriorly on forehead by stiff black or black-tipped hairs (tawny annulations on crown hairs of male topotype); long hairs below ear on hinder part of cheek near pale drab-gray; hairs on throat, chest and inner surfaces of fore and hind limbs near pale smoke-gray; hairs on abdomen sparse and darker; hairs on chin dark, near dark grayish-brown; tail like back above, the basal half noticeably

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darker than the terminal half, and with the light annulations very indistinct; underside of tail noticeably lighter and more grayish.

Pelage.—Hairs on median portion of crown of head directed backward from brown, closely appressed to the skin, and forming a V-shaped area which is overlapped laterally by inwardly directed hairs from the region between ears and eyes; hairs on fore part of cheeks and temples directed backward or obliquely upward, meeting the forwardly directed hairs in front of ear and on hinder part of cheek to form a bushy crest or conspicuous thick fringe which extends downward to meet chin whiskers; hairs on back of head internal to bases of ears noticeably longer, and curve backward and downward around scantily haired ears to merge with hinder cheek whiskers; hairs on upperparts fairly long, lax and silky; hairs on underparts and inner surfaces of upper arms rather sparse.

Skull.—Similar to that of *Macaca irus (mandibularis)*, but apparently with slightly longer upper pm-m tooth row. Maxillary tooth row (exclusive of canine) of type and of adult male topotype measures respectively, 30.3 and 30.5, whereas the same measurement for three adult males (Nos. 196815, 196826, and 198301, U. S. N. M.) from the mainland of eastern Borneo is respectively, 27.4, 28.3 and 28.

Measurements.—*Type*: Length of head and body, 440 mm.; tail, 575; hind foot, 135. An adult male and female topotypes, respectively: length of head and body, 415, 420; tail, 580, 530; hind foot, 136, 132. Skull (type and adult male and adult female topotypes, respectively): Greatest length (exclusive of incisors), 118, 115.5, 111; orbital width, 65.8, 63.8, 58.9; postorbital constriction, 37.2, 39.8, 40; mastoid breadth of braincase, 66, 62, 59; zygomatic width, 81.8, 78, 71.4; maxillary tooth-row (including canine), 39.8, 40.5, 35.

Remarks.—The long-tailed macaques living on the Nicobar Islands (*umbrosa*), as well as on Simalur Island (*fusca*) and Lasia Island (*lasiae*) off the west coast of Sumatra are characterized by the general blackish-brown coloration of the upperparts, and this dark coloration is duplicated on the race from Poelau Marathea. This dark coloration contrasts strongly with the tawny-ochraceous to olive-gray coloration of the other geographic races of *Macaca irus*. Furthermore, these four races are found on islands located on the outer circle of the general distributional range of *Macaca irus* and its geographic races. The skulls of these darker races, however, are not distinguishable from those of the neighboring lighter colored subspecies by well marked cranial details.

Specimens examined.—Total number, 4, from the type locality.

PROCEEDINGS
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NEW DICTYOPHARIDAE FROM THE NEW WORLD
(HOMOPTERA: FULGOROIDEA).

BY R. G. FENNAH,

*Entomologist, Food Crop Pests Investigation, Windward and Leeward
Islands.*

In dividing up the Dictyopharine genera of the New World Melichar (1912) retained two which were far from compact, these being *Dictyophara* Germar and *Nersia* Stål. Recently a series of *Dictyophara europaea* L., three specimens of which bore Melichar's label, was examined by the writer at the U. S. National Museum, and it was found that this species (the genotype) is not congeneric with any of the American Dictyopharini. A scrutiny of some of the species placed here or in the genus *Nersia* by Melichar has shown that they include several compact and natural groups which are separated below as new genera.

In drawing up the definitions below appeal has been made to characters not hitherto used in Fulgoroid generic classification. These include the general pattern of the aedeagal structure, the venation of the wings, the shapes of the first and third valvulae of the ovipositor and the sclerotised pattern on the bursa copulatrix. The last varies both between species and in broader design between genera, and it is already clear that in many cases it can be used for rigorous separation of species.

Since Melichar wrote his monograph *Dictyophara orbiculata* Fowler has been transferred to the Tropiduchid genus *Rotunosa* Distant. A new name, *Melicharoptera*, has been proposed by Metcalf for *Dictyoptera* Melichar (preoccupied by *Dictyoptera* Latreille 1829). Muir has described two new genera, *Brachytaosa* and *Parahydriena*, which he placed in this family. The writer has seen the type of the latter and has found it to be a Tropiduchid very closely allied to *Cyphoceratops* Uhl. *Beloncharis* Uhler is currently recognized as a subgenus of *Scolops* Schaum. This genus and *Phylloscelis* Germar include macropterous species and have been included for general convenience in the key provided below.

These genera, which are closely allied, have strong affinities with the Orgeriini and would be better placed there than along with Dictyopharini or with the African Lyncidini.

In compiling the key presented below the writer has relied solely on literature for characters of the genera *Brachytaosa* Muir, *Sicorisia* Mel., *Megadictya* Mel., *Dorimargus* Mel. and *Parahasta* Mel.

A synoptical table is also provided to facilitate comparison of the new genera proposed in this paper with *Nersia* Stål. It has also been thought advisable to indicate the salient generic characters of *Dictyophara* Germar (s. s.) as evinced in the European genotype.

KEY TO THE DICTYOPHARINI AND MACROPTEROUS ORGERIINI OF THE NEW WORLD

(1)	(2)	Vertex usually wider than long, with a facet outside lateral margin apically.....	3
(2)	(1)	Vertex usually longer than wide, conical or produced, devoid of a latero-apical facet.....	11
(3)	(4)	Profemora compressed.....	9
(4)	(3)	Profemora not compressed.....	5
(5)	(6)	Facet closed completely, pronotum smooth.....	7
(6)	(5)	Facet open ventrally, pronotum and frons pustulate..... <i>Chondrodera</i> Mel. 1912:157.	
(7)	(8)	A transverse carina at apex of vertex, three rows of areoles in membrane.....	<i>Taosa</i> Dist. 1906:355.
(8)	(7)	No distinct carina at apex of vertex, numerous irregular areoles in membrane.....	<i>Brachytaosa</i> Muir 1931:475.
(9)	(10)	Protibiae usually broadly expanded, vertex not produced.....	<i>Phylloscelis</i> Germ. 1839:191.
(10)	(9)	Protibiae not widened, vertex distinctly produced before eyes.....	<i>Sicorisia</i> Mel. 1912:160.
(11)	(12)	Tegmina with corium reticulate or with cross veins.....	13
(12)	(11)	Tegmina with corium not reticulate, devoid of cross veins.....	19
(13)	(14)	Clavus with transverse veins or reticulate..... <i>Plegmatoptera</i> Spin. 1839:283.	
(14)	(13)	Clavus devoid of cross veins.....	15
(15)	(16)	Post-tibiae with seven spines, tegmina fully 20 mm. long.....	<i>Megadictya</i> Mel. 1912:64.
(16)	(15)	Post-tibiae with four spines, tegmina smaller.....	17
(17)	(18)	Vertex broadly conical, distal part of corium with irregular cross veins.....	<i>Pteroplegma</i> Melichar 1912:66.
(18)	(17)	Vertex elongate cylindrical, almost whole of corium with cross veins.....	<i>Melicharoptera</i> Metc. 1938:335.
(19)	(20)	Protibiae very long and slender in relation to femora....	21
(20)	(19)	Protibiae not especially long in relation to femora.....	27
(21)	(22)	Cephalic process very short, peg-like, directed upward, or if absent, vertex hollowed out.....	23

- (22) (21) Cephalic process long and slender, narrower than vertex..... 25
- (23) (24) Cephalic process short, peg-like or in a broad ridge, not longer than eye, directed upward.....
- Igava* Mel. 1912:47.
- (24) (23) Cephalic process absent, disc of vertex hollowed, margins raised, a shining black spot at base of lateral carinae of frons..... *Hydriena* Mel. 1912:50.
- (25) (26) Cephalic process square in section, of equal width throughout, apex truncate, directed obliquely upward..... *Toropa* Mel. 1912:80.
- (26) (25) Cephalic process cylindrical, widened near apex, directed forward horizontally.....
- Lappida* Am. & Serv. 1843:505.
- (27) (28) Cephalic process strongly laterally compressed, grooved dorsally..... *Dictyopharoides* Fowl. 1900:44.
- (28) (27) Cephalic process not as above..... 29
- (29) (30) Tegmina leathery, feebly transparent, post-tibiae with six or seven spines..... *Scolops* Schaum 1850:68.
- (30) (29) Tegmina hyaline, not leathery..... 31
- (31) (32) Pronotum in side view inclined obliquely upward at 80°, frons in profile concave..... *Sicoris* Stål 1866:151.
- (32) (31) Pronotum in side view not inclined, flat..... 33
- (33) (34) Margins of vertex sharply constricted before eyes, cephalic process widened distally.....
- Paralappida* Mel. 1912:89.
- (34) (33) Margins of vertex not sharply constricted before eyes, cephalic process rarely widened distally..... 35
- (35) (36) Tegmina rather small with parallel sides and numerous cross veins in membrane, insect parallel-sided when at rest, cephalic process long..... 37
- (36) (35) Tegmina not small, somewhat widened distally, insect elongate-triangular with wings closed..... 41
- (37) (38) Clypeus set deeply into frons, sides of frons lower than suture at middle..... *Eudictya* Mel. 1912:113.
- (38) (37) Clypeus not set deeply into frons..... 39
- (39) (40) Pronotum with lateral carinae distinct, cephalic process parallel-sided, sides of frons visible from above.....
- Dorimargus* Mel. 1912:90.
- (40) (39) Pronotum with lateral carinae obsolete basally, cephalic process elongate conical, sides of frons not visible from above..... *Parahasta* Mel. 1912:108.
- (41) (42) Tegulae distinctly carinate, vertex short, triangular.... 43
- (42) (41) Tegulae not carinate, vertex elongate-triangular, or obtusely angulate apically..... 47
- (43) (44) A white line laterally from apex of vertex to costa, post-tibiae four-spined, M 3+4 not forked before nodal line..... 45

- (44) (43) Such a line, if present, bright green; post-tibiae three-spined, M 3+4 forked before nodal line.....
Trimedia gen. nov.
- (45) (46) Third valvulae of ovipositor rather elongate, narrow, frons not or scarcely ampliate before suture, membrane with two or three rows of areoles, R three branched in wings.....
Retiala gen. nov.
- (46) (45) Third valvulae of ovipositor subquadrate, broad, frons ampliate before suture; membrane with four or five rows of areoles, R four-branched in wings.....
Nersia Stål 1862: 63.
- (47) (48) Vertex elongate-triangular, or if not, then slender, pointed or rounded apically, not angulate..... 49
- (48) (47) Vertex pentagonal, even if elongated, apex always obtusely angulate, sides of head widely visible from above, six to eight rows of areoles, the apical series very short.....
Hyalodictyon gen. nov.
- (49) (50) Six or seven areoles adjoining nodal line, latter distinct, pronotum notched but not deeply..... 51
- (50) (49) No regular areoles on nodal line, latter distorted by distal reticulation, pronotum with a deep narrow notch on hind margin basally.....
Rhynchomitra gen. nov.
- (51) (52) Vertex elongate, as long as pro- and mesonotum together, frons distinctly widened before suture, pronotal lateral carinae strong at hind margin.....
Digitocrista gen. nov.
- (52) (51) Vertex not longer than mesonotum, or scarcely so, frons not or weakly ampliate before suture..... 53
- (53) (54) Vertex elongate-triangular, curved dorsad distally, post-tibiae four-spined.....
Mitrops gen. nov.
- (54) (53) Vertex as broad as long, flat, carinate throughout, post-tibiae three-spined.....
Pharodictyon gen. nov.

SYNOPSIS OF NEOTROPICAL GENERA HITHERTO GROUPED UNDER *Dictyophara* GERM. AND *Nersia* STAL.

Genus	Vertex longer than wide; generally	Vertex medially carinate	Median carina of vertex	Vertex	Apex of vertex	Frons ampliate before suture	Shape of basal union of frontal lateral carinae	Lateral carinae of pronotum reaching hind margin
<i>Taosa</i>	.....	.....	basal	short	straight, rounded	strongly	semicircular	Yes
<i>Mitrops</i>	conical	.....	basal	long	pointed	weakly	lanceolate	Yes
<i>Retia</i>	conical	Yes	complete	short	pointed	.....	mitrate	.....
<i>Digitocrisia</i>	cylindrical	Yes	complete	long	rounded	moderately	semicircular	Yes
<i>Rhynchomitra</i>	conical	Yes	basal	long	pointed	moderately	lanceolate	Yes
<i>Hyalodictyon</i>	cylindrical	Yes	complete	varied	obtusely angulate	distinctly	semicircular or obtusely angulate	.....
<i>Trimedius</i>	conical	Yes	complete	short	pointed	moderately	semicircular	.....
<i>Pharodictyon</i>	conical	Yes	complete	short	rounded	widened at level of sutures	semicircular	.....
<i>Nersia</i>	conical	Yes	basal	short	pointed	moderately	mitrate	.....
<i>Dictyophara europaea</i>	conical	Yes	basal	moderately long	pointed	weakly	lanceolate	Yes, weakly

Genus	Tegulae distinctly carinate	White line from apex of vertex to tegula	No. of spines on post-tibiae	Tegmina with M 3+4 forked be- fore nodal line	No. rows areoles in membrane	No. rows areoles along nodal line
<i>Taosa</i>.....	.....	.....	4	.....	3	7
<i>Mitrops</i>.....	.....	.....	4	.....	3	7
<i>Retiala</i>	Yes	Yes	4	.....	2-3	7
<i>Digitocrista</i>.....	.....	.....	4	.....	3	7
<i>Rhynchomitra</i>.....	.....	.....	4	Yes	Many	Many
<i>Hyalodictyon</i>.....	.....	.....	4	.....	6-8	8
<i>Trimedia</i>	Yes	.....	4	.....	3	8
<i>Pharodictyon</i>.....	.....	.....	3	.....	3-4	6
<i>Nersia</i>	Yes	Yes	4	.....	4-5	8
<i>Dictyophara europaea</i>.....	.....	.....	6-7	.....	2-3	6

Genus	Tegmina with apical areoles Longer than broad	As broad as long	No. rows of areoles embraced by M	No. of branches of R in wing	Aedeagus with basal part of spines	No. teeth 1st valvul- lae of ori- positor	Shape of 3rd valvulae
<i>Taosa</i>	Yes	.....	3	4	.....	about 12	rather elongate
<i>Mitrops</i>	Yes	.....	3	4	Yes	11	elongate
<i>Retiala</i>	Yes	.....	3	3	.....	6	rather elongate
<i>Digitocrista</i>	Yes	.....	3	4	.....	6	elongate
<i>Rhynchomitra</i>	Yes	.....	4	4	Yes	about 12	elongate
<i>Hyalodictyon</i>.....	.....	Yes	2	4-5	Yes	6	stout, subquadrate
<i>Trimedia</i>	Yes	.....	3	3	.....	6	subquadrate
<i>Pharodictyon</i>	Yes	.....	3	3	.....	6	subquadrate
<i>Nersia</i>.....	.....	Yes	3	4-5	.....	6	subquadrate
<i>Dictyophara europaea</i>	Yes	.....	3	3	.....	6	subquadrate

MITROPS gen. nov.

Vertex fully twice as long as broad across base, elongate-triangular, curved evenly upward distally, lateral margins converging to apex with a small but distinct notch before eyes, margins raised, horizontal in profile, disc flat, anteriorly concave, devoid of median carina distally, if not entirely, posterior margin transverse; frons elongate, margins feebly sinuate, only a little widened before clypeus, median carina present only at middle, lateral carinae strongly developed, meeting basally in an acute point, slightly converging in distal two-thirds reaching near to clypeal suture; genae slightly tumid before eyes, not ridged. Pronotum in middle line one quarter length of vertex, anteriorly convex, median carina strong, an impression near its base on each side, lateral carinae not reaching hind margin, carinae behind eyes of equal thickness. Protibiae not exceptionally long, post-tibiae with four spines. Tegmina with R simple to nodal line, M widely forked towards apex in corium, Cu forked basad of M fork, an apical and subapical row of transverse veins, in addition to nodal line, stigma with four cells. Wings with R four-branched, M four-branched at margin.

Aedeagus with a pair of basal spines on periandrium, a pair of straight spines at middle, and a pair distally on membranous sacs, penis ending in two long curved membranous limbs with a spine at apex of each. Ovipositor with first valvulae beset dorsally with a row of about ten teeth, a longer oblique tooth at apex, third valvulae elongate, six times as long as wide. Bursa copulatrix ornamented with sclerotised rings each bearing three sclerotised beadlets subequally spaced on ring.

Genotype *Fulgora noctivida* L. (1767) Syst. Nat. II: 750.

Vertex basally not carinate, strongly curved upward distally, basal spines of aedeagus three times as long as broad across base....

noctivida L.

Vertex basally carinate, not strongly curved upward distally, basal spines only as long as broad across base.....*curviceps* Stål.

RETIALA gen. nov.

Vertex longer than broad (less than 2 to 1), acutely triangular, flat or slightly curved dorsad at apex, disc flat, median carina distinct at base, much weaker distally, apex of vertex pointed, tip of frons and sides of head visible from above; frons elongated, scarcely three times as long as broad, lateral margins parallel, not ampliate before suture, disc flat, median and lateral carinae strong, lateral carinae diverging before uniting in a point at base, forming a mitrate outline, apically reaching transverse ridge near suture, median carina percurrent; clypeus medially carinate. Pronotum anteriorly roundly produced, posteriorly emarginate in an obtuse angle, median carina strong, with an impression on each side, lateral carinae of disc not attaining posterior margin, lateral marginal carinae of each side unequal, the dorsal carina being thickened, lateral fields devoid of an oblique carina; mesonotum about as long as broad, tricarinate; tegulae distinctly carinate. A white line laterally from

apex of head to costa. Protibiae not exceptionally long in relation to femora; post-tibiae with four spines. Tegmina with R branched near stigma, M forked once before nodal line, Cu forked slightly basad of M, cell M 1+2 in corium more than twice as long as wide, nodal and sub-apical lines of cross veins distinct, apical line very incomplete, so that only two rows of areoles lie between nodal line and margin for most part, seven areoles adjoining nodal line, areoles of apical series more than twice as long as broad. Wings with R three-branched, M four-branched.

Aedeagus devoid of basal spines.

Ovipositor with third valvulae elongate, slightly curved.

Genotype, *R. proxima* n. sp.

Retiala proxima n. sp.

Male.—Length, 5.5 mm.; tegmen 8.2 mm. *Female*. Length, 7.0 mm.; tegmen, 8.9 mm.

Green; base of lateral margins of frons piceous, a spot at apex of vertex, a line on each side before eye, along upper lateral marginal carina and along costa pallid, lower surface of costa pale.

Aedeagus with periandrium distally in form of a pair of membranous sacs devoid of spines, each sac produced dorsolaterally in a small wing-like lobe and ventrolaterally in a large conical lobe, the latter lobes diverging obliquely from each other when inflated at an angle of a hundred and ten degrees, the sacs appearing X-shaped in posterior view; medially two sclerotised blade-like processes, expanded membranously dorsally and ventrally; medio-dorsally a pair of spines directed posteriorly, overlain by a pellucid membranous hood.

Ovipositor with first valvulae beset with four small dorsal spines and two curved spines at apex, second valvulae blade-like, pointed distally, apical margin very oblique; third valvulae elongate, about three times as long as broad. Bursa copulatrix ornamented with sclerotised beadlets in round clusters of five or seven.

Described from three males and one female collected at Medellin, State of Vera Cruz, Mexico by C. F. Baker (1895). Type in U. S. N. M. It is possible that *Nersia pudibunda* Stål is a member of this genus.

DIGITOCRISTA gen. nov.

Vertex long, cylindrical, subtruncate but not angled at apex, a minute notch on lateral margins before eyes, sides of frons visible from above, lateral margins of vertex tapering for a short distance before eyes then parallel to apex, sides of head with a blunt ridge before eyes; frons elongate, median carina weak or obsolete at middle, lateral carinae strongly developed terminating just before suture, meeting at base in a curve, not a point; disc grooved in basal two-thirds, a groove between lateral carinae and lateral margins, deepening to sagittal carina at base of frons medially; lateral margins parallel, angulate or angulately bent forward before clypeal suture. Pronotum with lateral carinae of disc reaching hind margin, carinae of lateral margin prominent, of equal

thickness. Tegulae devoid of carina. Protibiae not exceptionally long; post-tibiae with four spines. Tegmina with R forked close to stigma, M once forked just distad of Cu fork, Cu forked in middle of corium, nodal, subapical and apical lines of cross veins only present, seven rows of areoles adjoining nodal line, M embracing three, a groove along middle areole, areoles on apical margin moderately long; stigma with three or four cells. Wings with four or five branches of R at apical margin, two, three or four branches of M.

Aedeagus devoid of a pair of basal spines, a pair of slender spines dorsally, and a pair of long curved membranous tubes each ending in a sclerotised point; membranous portion of periandrium when inflated forming a large curved sac bordered on each side by a smaller sac with a sclerotised patch at apex.

Anal segment of female short. Ovipositor with first valvulae beset dorsally with four teeth, apically a pair of curved spines; second valvulae slender, blade-like, parallel-sided, third valvulae somewhat elongate, three times as long as broad in middle. Bursa copulatrix ornamented with minute sclerotised beadlets arranged in an elongate oval.

Genotype *Nersia bubala* Stal (1862) Rio Jan. Hem. II: 63.

In the genotype the bursa copulatrix has the sclerotised beadlets arranged in an elongated oval of twenty, with two or three in the middle, these numbers being counted on the dorsal surface of the organ where the ornamentation is most fully developed.

RHYNCHOMITRA gen. nov.

Vertex elongate or conical, slightly curved upward distally, lateral margins tapering evenly to apex, median carina distinct basally, obsolete at apex. Frons elongate, margins almost parallel, slightly widened before suture, median and lateral carinae strong, all reaching suture, lateral carinae meeting basally in an acute point. Pronotum with anterior margin strongly convex between eyes, posterior margin rectangularly excavate, a deep-parallel sided notch at middle, lateral carinae of disc reaching hind margin. Protibiae not remarkably long; post-tibiae with four spines. Tegmina with R forked near stigma, M forked distad of Cu fork, Cu forked at middle of corium, membrane reticulate with ten or twelve rows of areoles, stigma approximately five-celled. Wings with four branches of R and four of M at apical margin.

Aedeagus with a pair of spines ventro-basally, a longer pair dorso-laterally, a minute spine on apical membranous sac of each side; penial spines long, curved, fleshy, with a sclerotised spine at tip. Ovipositor with first valvulae beset dorsally with a row of about ten teeth, a longer curved spine at apex; third valvulae elongate, about three times as long as broad at middle. Ornamentation on bursa copulatrix elongate-oval, three celled, with a beadlet on each dissepiment and two beadlets between each.

Genotype, *Dictyophara microrhina* Wlk. 1851 List. Hom. II: 315.

Rhynchomitra mexicana n. sp.

Male. Length 7.0 mm.; tegmen, 7.5 mm.

Vertex longer than broad (3:1), medially carinate in basal fifth, slightly turned upward distally; frons with median carina obscure just before apex. Tegmina with reticulation beginning at fork of R, basad of stigma by three quarters of its length.

Green; apical portion of tibiae and tarsi tinged reddish-brown. Tegmina and wings hyaline.

Aedeagus with ventrobasal spines very short, scarcely longer than broad across base, not visible from above, directed laterad; a pair of medio lateral spines curved anteriorly with sacs inflated, latero-apical sacs with a sclerotised patch apically; penial processes long, recurved, sclerotised in a point distally.

Described from a single male taken at Vera Cruz, Mexico by P. R. Uhler ("3.10").

This species differs from *microrhina* in having the vertex relatively broader, though not as broad or as short as in *recurva* Metc., and in the more pronounced upward tilt at the apex. The reticulation of the membrane near the fork of the radius is generally different from that of either of these species, while the basal spines of the aedeagus are so much shorter than in *microrhina* that the two can be reliably separated on this character alone. *Dictyophara lingula* V. D. also belongs to this genus.

HYALODICTYON gen. nov.

Vertex slightly or distinctly produced before eyes, lateral margins slightly converging distally, rarely parallel, apical margin transverse or obtusely angulate, often with subparallel base of frontal carinae projecting beyond it; median carina distinct, percurrent, sometimes a slight transverse mark or ridge across vertex a little distad of eyes, most visible at margins, sides of head before eyes visible from above; frons relatively broad, flat, lateral margins subparallel distinctly angulately or roundly widened before suture, median carina percurrent, lateral carinae not always reaching suture, united basally to form a semicircle or an obtuse angle. Pronotum anteriorly convex, posteriorly angularly emarginate, median notch on posterior margin not deep, pronotal disc tricarinate, lateral carinae obliquely interrupted at middle, not reaching posterior margin, lateral marginal carinae equally strong. Tegulae not carinate. Protibiae not relatively long and slender, post-tibiae armed with four spines. Tegmina with R forked near stigma, M forked once before nodal line, cell M 1+2 elongate, Cu forking basad of M, stigma with three to six cells, eight areoles adjoining nodal line, M embracing two or three, nodal areoles long, six to eight rows of apical areoles, those at margin short, not twice as long as broad, or scarcely so. Wings with R four or five-branched at margin, M four-branched.

Aedeagus with a pair of basal spines.

Ovipositor with first valvulae with a dorso-mesal ridge with three short oblique spines, and a ventro-lateral ridge bearing three blunt curved

teeth which project distally, third valvulae subquadrate, somewhat angulately rounded at apical margin. Ornamentation of bursa copulatrix in form of sclerotised rings each studded with two or three beadlets.

Genotype, *Dictyophara nodivena* Wlk. 1858 Ins. Saund.: 37.

The members of this genus are all large and differ considerably in the shape of the head but in all it is stoutly built and angulate at the apex of the vertex. The following species of *Dictyophara* (*sensu lato*), *taurina* Stål, *fusiformis* Wlk., *brachyrhina* Walk., *truncata* Wlk., *obtusifrons* Wlk., and *apicata* Mel., are apparently congeneric.

TRIMEDIA gen. nov.

Vertex flat, as long as broad or a little longer, approximately triangular but actually seven-sided, lateral margins converging distally, apical margin obtusely angulate, posterior margin transverse or very slightly excavate, median carina distinct basally, weakly percurrent, sides of frons visible from above; frons flat, lateral margins subparallel in basal half, ampliate before clypeus, median and lateral carinae equally strongly developed, latter slightly converging distally, reaching clypeus or abruptly ending very near to it, basally uniting to form a wide curve somewhat pointed at apex. Pronotum two-thirds as long as vertex, median carina distinct, lateral carinae obsolete, the upper carina of each lateral marginal pair thickened. Tegulae distinctly carinate. A white line laterally from apex of head to costa. Protibiae not exceptionally long, post-tibiae with four spines. Tegmina with R forked near stigma, M forked at middle of corium and branch M 3+4 forked in apical third of corium, Cu forked basad of first fork of media, nodal, subapical and apical lines present, eight arcoles adjoining nodal line, M embracing three, two of these being grooved, areoles at apical margin usually more than twice as long as broad. Wings with R three-branched, M four-branched at margin.

Ovipositor with first valvulae with three spines on dorsal margin and two curved spines distally, third valvulae subquadrate. Bursa copulatrix ornamented with non-sclerotised rings closely set with about twenty beadlets.

Genotype *Nersia viridata* Stål 1862 Rio Jan. Hem. II: 64.

Two females were seen from Cordova, Mexico (coll. P. R. Uhler) and one from Peru (coll. Dr. P. Weiss).

PHARODICTYON gen. nov.

Vertex as long as broad at base, flat lateral margins converging to near apex then parallel, median carina percurrent; frons with sides subparallel, margins a little raised but not ampliate or angulate before suture, sometimes expanded at level of junction with clypeus, lateral carinae prominent, ovately united at base, most widely separated one quarter from

base, reaching almost to suture, median carina distinct basally, becoming obsolete distally; clypeus peculiar in having a broad distinct trough, curved in section, inside each lateral margin, median carina very prominent. Pronotum much wider than head, anteriorly moderately convex, posteriorly angularly excavate, median notch small, median carina distinct, lateral carinae obsolete, marginal carinae of equal thickness, slightly angularly bent. Tegulae without a distinct carina. Mesonotum broad, feebly tricarinate, a space between point of junction anteriorly of carinae and hind margin of pronotum. Protibiae not exceptionally long, post-tibiae trispinose. Tegmina broad, R forking basad of stigma by half length of latter, M forking at middle of tegmen, M 3+4 forking before M 1+2, transverse veins R-M, M-Cu basad of nodal line, Cu forked at basal quarter of tegmen, stigma with four cells, a series of six areoles adjoining nodal line, subapical and apical lines distinct and regular. Wings with R three-branched at margin, M four-branched.

Pygofer with lateral angle peculiar in being produced in a process. Aedeagus devoid of a basal pair of spines.

Ovipositor with first valvulae dorsally beset with three spines, two large curved spines at apex; third valvulae broadly subquadrate. Bursa copulatrix ornamented with large delicate rings each bearing about twelve headlets.

Genotype, *P. latum* n. sp.

Pharodictyon latum n. sp.

Male.—Length, 6.0 mm.; tegmen 8.7 mm. Female.—Length, 6.2 mm.; tegmen, 9.0 mm.

Width of tegmen of above female 4.0 mm. at widest part.

Green; pro- and mesotarsi reddish brown, post-tibiae spines black; tegmina and wings hyaline.

Pygofer with lateral angles produced posteriorly in an elongate lobe, slightly narrowed at base. Aedeagus cylindrical basally, distally swollen into a membranous sac on each side; a stout spine ventrolaterally on each sac directed outward, a similar but shorter spine more distally directed obliquely mesad; dorsally two pair of slender, parallel processes blade-like and closely apposed.

Bursa copulatrix ornamented with large, well-spaced thin-margined circles each studded regularly along margin with about twelve beadlets.

Described from one male from Rurrenabaque, Beni (November) and one female from Huachi, Beni, Bolivia (September) taken by W. M. Mann, one female from the mouth of the Rio Mapiti, taken possibly by the same collector on the Mulford Biological Expedition (1921-22) and a third female from Yunges de la Paz, Bolivia, collector unknown. This genus is well distinguished by the broad tegmina, the shape of the vertex and pronotum, and the lobate pygofer. Type in U. S. N. M.

NERSIA Stål.

Stål 1862 Rio Jan. Hem. II: 63.

Genotype, *N. haedina* Stål, Melichar 1912 Abh. Zool.-Bot. Ges. Wien vii, 1: 68.

Vertex longer than broad, rarely broader than long, triangular, lateral margins converging apically, not quite meeting at apex, median carina distinct at base, lateral margins of frons visible from above; frons scarcely more than twice as long as broad in middle, sometimes less than this, lateral margins parallel in basal half, ampliate before suture, median carina percurrent, sometimes feeble in basal half, lateral carinae distinct, roundly united above, obsolete in apical third. Pronotum anteriorly convex, disc produced, posteriorly obtusely excavate, median notch small, not deep, median carina distinct, lateral carinae weak, not reaching posterior margin, upper marginal carina thickened; mesonotum tricarinate. A white line from apex of head to costa, costa piceous below. Prothibiae not exceptionally long, rather slender, post-tibiae with four spines. Tegmina with R forked basad of stigma by a third of its length, M forked once near middle of tegmen, Cu forked a little basad of M fork, stigma with three cells, eight areoles adjoining nodal line, four or five rows of arcoles in membrane, apical areoles usually not twice as long as wide. Wings with R four or five-branched at margin.

Aedeagus devoid of a pair of basal spines.

Ovipositor with first valvulae beset dorsally with three spines, a second row of three spines on ventral margin distally, third valvulae subquadrate, bluntly pointed on apical margin. Bursa copulatrix ornamented with sclerotised circles or ovals each bearing two or three club-like processes directed medially, pustulate at apex.

Nersia florida n. sp.

Male.—Length 8.1 mm.; tegmen, 9.3 mm. Female.—Length, 8.1 mm.; tegmen, 9.9 mm.

Vertex longer than broad (1.25 to 1), tapering to apex.

Green; tegmina and wings hyaline.

Aedeagus with perianthium tubular, sclerotised and cylindrical in basal half, distal half membranous with a lateral sac obliquely directed upward and posteriorly on each side and an elongate sac similarly curved ventrally in middle line, with a pair of minute plates each minutely crenulate on distal border asymmetrically placed on each side at its apex; penial spines sclerotised curved at apex to point anteriorly, then strongly deflexed to point ventrally.

Bursa copulatrix ornamented with simple sclerotised rings each bearing a short peg-like process directed towards middle, and bearing at its tip four or five beadlets.

Described from two males and a female collected by E. D. Ball at Sanford, Fla., U. S. A. (7.7.'26 and 18.7.'27). This species differs from

specimens from Mexico which the writer assigns to *florens* Stål in the shape of the penial spines on the aedeagus. Type in U. S. N. M.

The writer considers that *sertata* Jacobi, *aridella* Mel., *chlorophana* Mel., and *virescens* Spin. (as identified from specimens from the various type localities that agree with Melichar's descriptions) are probably congeneric with *haedina* Stål.

DICTYOPHARA Germar.

Germar 1833 Silb. Rev. Ent. 1:175. Logotype, *Fulgora europaea* L.
Distant, F. B. I. III:241
(1906).

Dictyophara europaea L.

Linnaeus 1767 Syst. Nat. II:704, 9.

In addition to the characters of this species given in the synopsis which are considered typical of its genus the following are also distinctive. Pronotum with an oblique carina on each side below pair of lateral marginal carinae. Tegmina with transverse veins R-M, M-Cu situated distinctly basad of transverse veins at apex of cell M 1+2.

Aedeagus devoid of spines at base, distal paired sacs of periandrium each bearing spines (thirteen in *europaea* L.); penis with paired processes angularly recurved at apex.

Bursa copulatrix ornamented with groups of bead-like processes arranged in a circle, each process minutely pustulate distally [in *europaea* L. five or six processes are arranged in a circle, each with five pustules distally].

Subfamily ORGERIINI.

ORGERIUS Stål.

Stål 1859 Freg. Eugen. Resa. Ins. 273 Genotype *O. rhyparus* Stål
loc. cit.:274.

The chief characters of this Western North American genus are as follows.

Vertex triangular, longer than broad, lateral margins somewhat raised; frons about two and a half times as long as broad, median carina strong, percurrent, disc of frons much elevated, portions laterad of disc turned obliquely outward, almost in same plane as genae; eyes rounded posteriorly. Pronotum with disc subquadrate, projected anteriorly, accurately emarginate on posterior margin, pronotal carinae strongly developed; mesonotum with lateral carinae strong. Tegmina with reticulate venation strongly standing out from corial surface. Anal segment of male elongate, distinctly longer than broad.

A European species assigned to this genus, which the writer has examined, has proved to be quite distinct on generic characters. The writer therefore places it in a new genus *Palaeorgerius*.

PALAEORGERIUS gen. nov.

Genotype, *Orgerius montandoni* Horvath, 1911 Ann. Mus. Nat. Hung. ix: 609.

The salient characters of this genus, as compared with *Orgerius* Stål are given below.

Vertex arcuate-triangular, broader than long, lateral and apical margins devoid of carinae, not raised; frons not twice as long as broad, disc flattened, median carina not raised, portions of frons laterad of lateral carinae in same plane as disc of frons, not at all turned outward; eyes shallowly excavate posteriorly.

Pronotum with disc three times as broad as long, posterior margin transverse or very shallowly concave, pronotal carinae weak, lateral carinae of disc obsolete; mesonotum with lateral carinae obsolete. Tegmina with veins, except costa, very weak, not raised above corial surface. Anal segment of male wider than long, or as wide as long.

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 STAL, C., 1866. Hemiptera Africana iv: 1-275.

EXPLANATION OF PLATES.

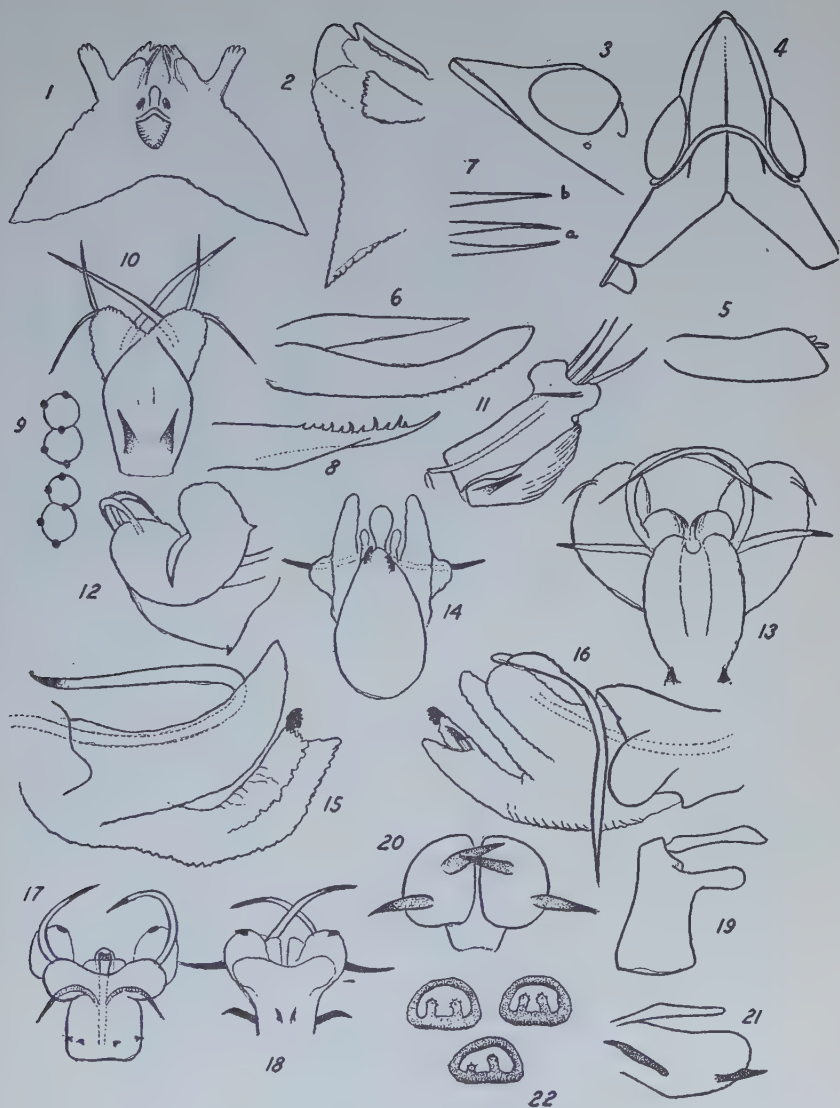
PLATE I.

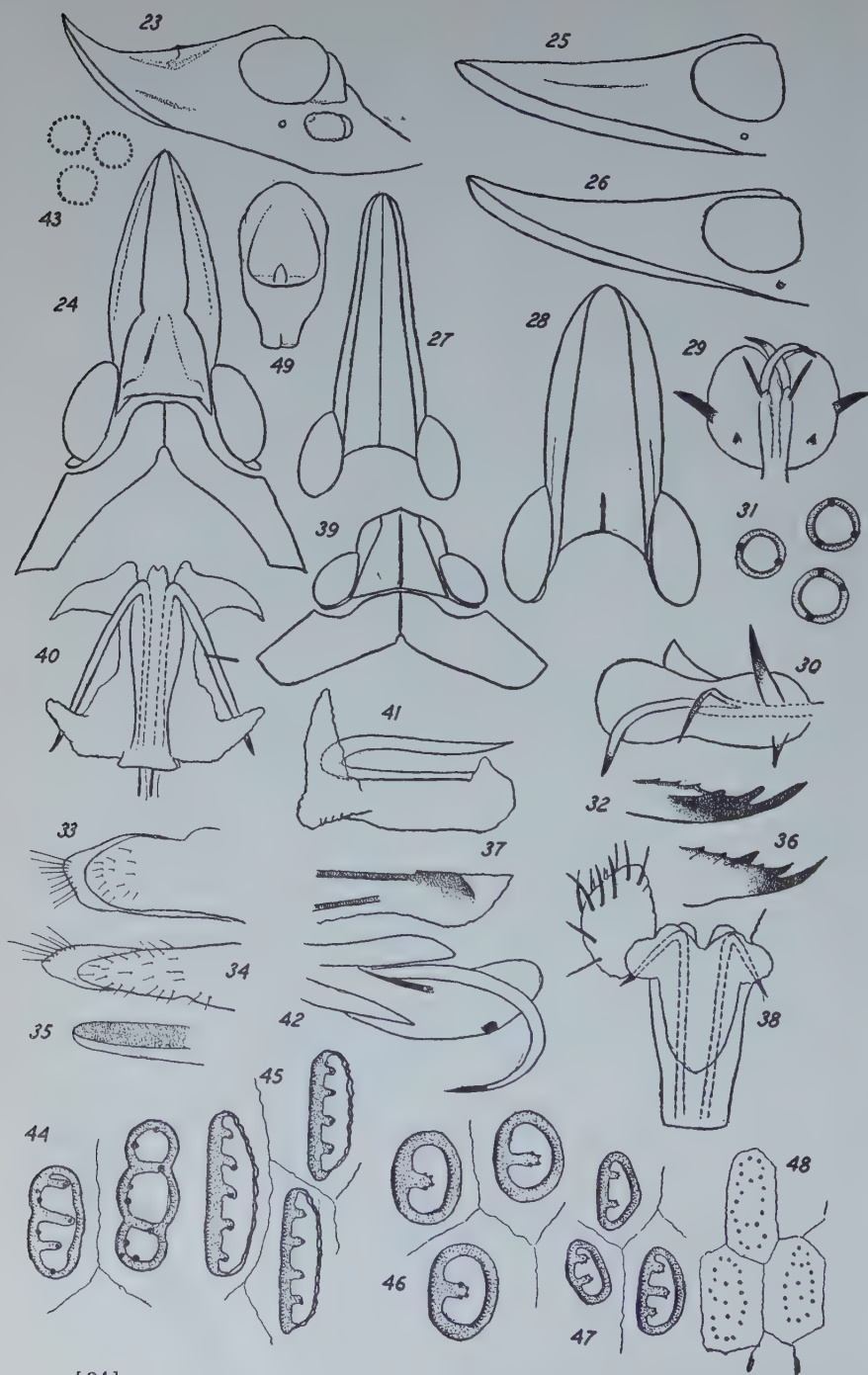
1. *Retiala proxima* Fenn., aedeagus, posterior view.
2. Idem, aedeagus, right side.
3. Idem, apex of head in profile.
4. Idem, head, pronotum and tegula, dorsal view.
5. *Mitrops noctivida* L., anal segment of female.
6. Idem, third valvula of ovipositor, left side.

7. Idem, second valvulae of ovipositor (a) ventral view, (b) side view.
8. Idem, first valvula, left side.
9. Idem, portion of ornamentation on bursa copulatrix.
10. Idem, aedeagus, ventral view.
11. Idem, aedeagus, lateral view.
12. *Mitrops curviceps* Stål, aedeagus, right side.
13. Idem, aedeagus, ventral view.
14. *Nersia florens* Stål, aedeagus, posterior view.
15. Idem, aedeagus, left side.
16. *Nersia florida* Fenn., aedeagus, right side.
17. *Rhynchomitra mexicana* Fenn., aedeagus, dorsal view.
18. *Rhynchomitra microrhina* Wlk., aedeagus, dorsal view.
19. *Pharodictyon latum* Fenn., pygofer, left side.
20. Idem, aedeagus, ventral view.
21. Idem, aedeagus, left side.
22. *Nersia aridella* Mel., portion of ornamentation on bursa copulatrix.

PLATE II.

23. *Mitrops noctivida* L. head, in profile.
24. Idem, dorsal view.
25. *Rhynchomitra mexicana* Fenn., head in profile.
26. *Rhynchomitra microrhina* Wlk., head in profile.
27. Idem, head, dorsal view.
28. *Rhynchomitra mexicana*, Fenn., head, dorsal view.
29. *Hyalodictyon nodivena* Wlk., aedeagus, ventral view.
30. Idem, aedeagus, right side.
31. Idem, portion of ornamentation on bursa copulatrix.
32. Idem, first valvula of ovipositor, left side.
33. Idem, third valvula of ovipositor, right side.
34. *Digitocrista bubala* Stål, third valvula of ovipositor, right side.
35. Idem, second valvula, right side, apical portion only.
36. *Dictyophara europaea* L., first valvula of ovipositor, left side.
37. Idem, second valvula of ovipositor, left side.
38. Idem, aedeagus, ventral view, right side incomplete distally.
39. *Pharodictyon latum* Fenn., head and pronotum, dorsal view.
40. *Nersia sertata* Jacobi, aedeagus, dorsal view.
41. Idem, aedeagus, right side.
42. *Digitocrista bubala* Stål, aedeagus, left side.
43. *Trimedia viridata* Fenn., portion of ornamentation on bursa copulatrix.
44. *Rhynchomitra microrhina* Wlk., ditto.
45. *Taosa herbida* Wlk., ditto.
46. *Nersia florida* Fenn., ditto.
47. *Nersia sertata* Jacobi, ditto.
48. *Digitocrista bubala* Stål, ditto.
49. *Orgierius rhyparus* Stål, anal segment of male.





PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTON

A NEW BUTTERFLY FROM THE SOLOMON
ISLANDS.¹

AUSTIN H. CLARK.

Among the butterflies sent home from the southwest Pacific area by Mr. James Paul Burke is an interesting undescribed form of the widely distributed and highly variable *Papilio priamus*, the first of the giant ornithopteras or "bird-winged butterflies" to come to the attention of Europeans.

This new form appears to be intermediate between *Papilio priamus urvillianus* from the Bismark Archipelago and the northern Solomon Islands and *P. p. coelestis* from the Louisiade Archipelago southeast of New Guinea. The average size is smaller than that of the former, while the color approaches that of the latter which, however, is markedly smaller.

In this species the colors of some of the forms, especially the blue or golden ones, are subject to a certain amount of alteration after preservation, and indeed may be variable in life. In the case of the specimens described below fifteen were received so soon after capture that they were still sufficiently flexible to be set without recourse to relaxation. The colors are presumably, therefore, those of the living insect.

Papilio priamus burkei, subsp. nov.

Male.—*Above*: Resembles the male of *P. p. urvillianus* from New Mecklenburg and Bougainville, but in fresh specimens slightly less greenish and somewhat darker, with age becoming a deeper purplish blue—plum purple of Ridgway; the greenish tinge frequently seen near the inner border of the hind wings in *P. p. urvillianus* is lacking. *Below*: In general similar to *P. p. urvillianus*; on the fore wings all the markings are darker and less greenish, and the spots in the interspaces are smaller; the hind wings are darker, the anterior and outer portions darker and more bluish green, the central and inner portions darker and more or less tinged with violet. The average size (length of fore wing) is less than in *P. p. urvillianus*, but the largest specimens of *P. p. burkei*

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are considerably larger (4 mm.) than the smallest of *P. p. urvillianus*. Described from 45 specimens.

Female.—*Above*: Resembles the female of *P. p. urvillianus*, but the light markings are lighter, clearer, and less infuscated, and on the fore wings more extensive, the band in the cell of the fore wings being usually large, broad, and conspicuous. *Beneath*: Resembles the female of *P. p. urvillianus*, but the light markings are clearer grayish white, not at all or only slightly infuscated. The body is less strongly tinged with yellow that it is in *P. p. urvillianus*. The average size (length of fore wing) is considerably less (11 mm.) than in *P. p. urvillianus*, and the largest specimens only just equal the smallest of that form. Described from 27 specimens.

Measurements.—There are available for comparison 20 specimens of *P. p. urvillianus* bearing the following data—New Mecklenburg (1); Bouin, Bougainville Island (5); "Siam" (presumably an erroneous transcription of "Bouin") (6); Solomon Islands (1); and without locality (presumably commercial specimens from Bougainville Island) (7).

The length of the fore wing in the specimens of *P. p. burkei* and *P. p. urvillianus* at hand is as follows:

<i>P. p. burkei</i>	<i>P. p. urvillianus</i>
♂ ♂ 76–89 mm. (average of 45, 84 mm.).	83–92 mm. (average of 9, 89 mm.).
♀ ♀ 82–106 mm. (average of 27, 99 mm.).	105–116 mm. (average of 11, 110 mm.).

Locality.—Southern Solomon Islands; collected by James Paul Burke.

Holotype, ♂, *Allotype*, ♀, and *Paratypes* ♂ and ♀, U. S. N. M., Cat. No. 57176. Other paratypes, male and female, have been presented by Mr. Burke to the Museum of Comparative Zoology, Cambridge, Mass.; the American Museum of Natural History, New York, N. Y.; the Academy of Natural Sciences, Philadelphia, Pa.; and the British Museum (Natural History), London, England.

Remarks.—Fresh males do not differ much in color above from males of *P. p. urvillianus*, but apparently they soon acquire the characteristic purplish cast which deepens with age so that worn males are markedly different. Males of any age are at once distinguishable by the smaller spots in the interspaces of the forewings below, and by the purer blue color of these spots. The females, judging from the series at hand, appear to be quite constant in their pattern, and are readily distinguishable from those of *P. p. urvillianus*.

PROCEEDINGS
OF THE
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A NEW TEIID LIZARD OF THE GENUS *ECPLEOPUS*
FROM BRAZIL.

By ARTHUR LOVERIDGE.

During her most recent visit to the United States, Dr. Bertha Lutz invited my attention to two lizards which she thought might possibly represent an undescribed species. This appears to be the case and the lizards are of especial interest on account of their undoubted relationships with two genera—*Ecpleopus* Duméril and Bibron, 1839, and *Euspondylus* Tschudi, 1845. Both these genera, as now understood, have representatives in Brazil and Ecuador, etc.

Miss Lutz's specimens agree with *Ecpleopus* in having a nontransparent disk, composed of several scales, in the lower eyelid. They agree with *Euspondylus* in having a well-developed collar fold, quadrangular dorsals, and in particular with *guentheri* O'Shaughnessy in scalation of occiput and body. As to femoral pores in the male nothing can be said for neither lizard has any, probably both are females, one certainly seems to be while the viscera of the other is too macerated for sexing. I therefore propose naming them for their collector:

Ecpleopus lutzae sp. nov.

Cotypes.—Museu Nacional do Brasil, No. — ?, and Museum of Comparative Zoology, No. 46,991, apparently an adult ♀, both from bromeliads at about 3,500 feet, above the Beija-Flor River, Theresopolis, Rio de Janeiro, Brazil, collected by Dr. Bertha Lutz, January, 1937.

Diagnosis.—Differs from *E. gaudichaudii* Duméril & Bibron in many ways, among which one might mention that the enlarged anterior supraciliary does not separate the prefrontals from the loreal, also the presence in *lutzae* of a pair of very large occipitals.

From *E. affinis* Peters, which has 3 occipitals, in having 38-40 (not 46-48) scales between occiput and base of tail; in having 30 (not 39-41) scales, including ventrals, around midbody, and in other ways.

From *Euspondylus guentheri* (O'Shaughnessy) both in these and other scale counts, color pattern, and generic character of eyelid.

Description.—Head slightly distinct from neck; frontonasal longer than broad; a pair of large prefrontals; frontal hexagonal, longer than the interparietal, which is longer than the parietals; frontoparietals small; occipitals 2-4, very large; supraoculars 4; anterior smallest; nostril in an entire nasal; loreal large; preocular small, triangular; a series of infraoculars; upper labials 6-7; lower labials 5-6; a single anterior chin-shield followed by 2 pairs in contact and 2 smaller pairs widely separated; 14-15 transverse rows of squarish gulars between the last chin shield and edge of collar; collar-shields 5.

Body slender, elongate; dorsal scales large, regular, smooth or obtusely keeled, juxtaposed, as long as but narrower than the ventrals, 38-40 between occiput and base of tail; about 30 scales, including ventrals, around middle of body; lateral scales small, suboval; ventrals in 8 longitudinal and 25 transverse series; 3 anterior and 5 posterior preanals; limbs covered with large, smooth shields; feet pentadactyle; digits elongate, all clawed.

Tail long, cylindrical, tapering, encircled by large, oblong or squarish scales.

Color.—Above, pale chocolate brown with or without irregular necks of darker brown which may coalesce to form a vertebral and longitudinal lateral lines; limbs, including digits, blotched with white. Below, white, freely speckled with brown.

Size.—Total length of ♀ (M. C. Z. 46991), 150 (55+95) mm., of other specimen (M. N. B. — ?), 132 (50+82) mm.

Diet.—Remains of two sourbugs or woodlice, and an insect larva in one lizard.

PROCEEDINGS
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A NEW MANAKIN FROM CERRO YAPACANA,
UPPER ORINOCO VALLEY, SOUTHERN VENEZUELA.

BY HERBERT FRIEDMANN¹

In his revision of the races of *Manacus manacus*, Zimmer (Am. Mus. Novit. No. 889, 1936, 18-21) considers the race *M. m. interior* Chapman to be the bird of eastern Peru (Puerto Indiana, Pebas, Nauta, etc.), eastern Ecuador (Rio Suno, Zamora, Rio Curaray, etc.), and eastern Colombia (Villavicencio, "Bogota"), east to upper Amazonia as far as the upper Rio Negro in Brazil and to the lower Caura River in Venezuela. Pinto (Rev. Mus. Paulista, xxiii, 1938, 525) also lists birds from the upper Rio Negro, Brazil, as *interior*. In the collections made in 1930 and 1931 in the Rio Negro basin and in that of the upper Orinoco by E. G. Holt, E. R. Blake, and C. T. Agostini, there is a fine series of *Manacus manacus* from these areas. The Rio Negro birds (from Sao Gabriel, the same locality as Pinto's material) agree very well with *M. m. interior* from Bogota and with the descriptions and critical comments in literature. The birds from the upper Orinoco are, however, strikingly different, being much darker on the underparts of the body and somewhat so on the nape. They are darker on the abdomen and vent than *M. m. gutturosus* (Desmarest) of southern Brazil and adjacent parts of Paraguay and Argentina; in fact they are the darkest specimens of the species that I have seen.

For the dark bird of the upper Orinoco, I propose the name

Manacus manacus umbrosus, subsp. nov.

Type.—U. S. Nat. Mus. 328736, ad. ♂, in breeding condition, collected

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at Cerro Yapacana, Upper Orinoco, Venezuela, March 28, 1931, by Holt, Blake, and Agostini.

Subspecific characters: similar to *M. n. interior* Chapman, but with the lower breast, entire abdomen, sides, flanks, thighs, and under tail coverts darker—deep gull gray darkening on the thighs and under tail coverts to slate gray, and with the white band across the nape much suffused with grayish.

Range.—Known only from Cerro Yapacana, Upper Orinoco, Venezuela. Cerro Yapacana, is an isolated mountain mass; altitudes were not recorded on all the specimens, but they seem to have come from less than 1,000 feet elevation (two of them from 933 feet).

Measurements of type.—Wing 53; tail 30; culmen from base 12 mm.; 5 other males from the type locality measure: wing 52–54 (53); tail 30–32 (31); culmen from cere 11.9–12.5 (12.1 mm.).

Remarks.—The distribution of this race must be rather limited inasmuch as *M. m. interior* occurs in the Upper Rio Negro valley not very far to the south and again at the junction of the Caura and the Orinoco Rivers not very far to the northeast. A male from Buena Vista, on the east bank of the Rio Cassiquiare, Venezuela, recorded by Zimmer as *M. m. manacus* may also belong in *M. m. umbrosus*. The material of the new form is clearly different from specimens of the nominate race from British Guiana (the type locality of *M. m. manacus* is Surinam; the range—the Guianas and northern Brazil west as far as Manaos).

Three immature specimens of *umbrosus* in the greenish plumage are not distinguishable from comparable examples of *interior*.

Material examined:

M. m. manacus: British Guiana—4 ad. ♂; Brazil—Manaos 1 ♀.

M. m. trinitatis: Trinidad—4 ad. ♂, 1 ad. ♀.

M. m. gutturosus: Brazil;—Bahia, 4 ad. ♂; Jaboticabal, 1 ad. ♂; Piquette, 1 ad. ♀.

M. m. purus: Brazil—Santarem, 1 ♂, 2 ♀; Diamantina 1 ad. ♂ 1 ad. ♀; Maica 1 ad. ♂.

M. m. interior: Colombia—Bogota, 5 ad. ♂, 1 ad. ♀; Peru—Pebas 1 ad. ♂; Brazil, Sao Gabriel 5 ♂, 1 ♀.

M. m. leucochlamys: Eduacor—Guayaquil, 2 ad. ♂.

M. m. abditivus: Colombia—Santa Marta Mountains, 2 ad. ♂; Fundacion 1 ad. ♂.

M. m. umbrosus: Venezuela—Cerro Yapacana, Upper Orinoco, 6 ad. ♂, 2 im. ♂, 1 im. ♀.

PROCEEDINGS
OF THE
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NOTES ON THE TAXONOMY OF THE
TROMBICULID MITES.

BY H. E. EWING,

*Bureau of Entomology and Plant Quarantine, Agricultural Research
Administration, United States Department of Agriculture*

The following notes on the trombiculid mites have to do chiefly with their classification. In 1929 the writer established the subfamily Trombiculinae for all the trombiculid mites (chigger mites) which at that time were included in six genera. In 1938 this key was enlarged in the form of a classification to include 15 genera. There are now described in the group no less than 26 valid genera, one of which is decidedly divergent and unusual. For it a new subfamily is here created and the trombiculid group as a whole is raised to the rank of a family. In addition two new genera are established, a new generic name is proposed, and the status of a specific determination is discussed.

Trombiculidae, new family.

The family Trombiculidae here established may be separated from the Trombidiidae which previously has included it by means of the following key:

- Abdomen of adults and nymphs strongly constricted somewhat in front of middle; eyes, when present, never stalked, frequently situated near base of cephalothorax and frequently farther caudad than the pseudostigmata. Eggs laid singly. Larvae parasitic on vertebrates. Trombiculidae, new family
- Abdomen of adults and nymphs not constricted; eyes usually present and frequently stalked, but never situated near base of cephalothorax or farther caudad than the pseudostigmata. Eggs laid in clusters. Larvae parasitic on invertebrates. Trombidiidae

Hemitrombiculinae, new subfamily.

Characters of larvae: Chelicerae each with only one dorsal tooth,

Palpal claw divided into two prongs. Eyes present. Dorsal plate without anterior median process, crista, median seta or submedian setae. Abdomen not constricted behind the shoulders and without posterior dorsal plate; setae all simple, arranged in transverse rows. Tarsal claws two, unequal.

Type genus: Hemitrombicula Ewing.

This subfamily is erected for the very peculiar genus *Hemitrombicula*, and its only species, *H. simplex* Ewing. This species has been taken only from the inside of the mouth of a North American snake, where the mite larvae were attached between the rows of teeth.

Crotiscus, new genus.

Characters of larvae: Each chelicera armed with a single dorsal tooth. Palpal claw simple, undivided. Dorsal plate without median process, or carinae and provided on its anterior margin with a median seta and a lateral pair of pectinate setae. Pseudostigmata nearer the anterior margin than the posterior margin of dorsal plate; pseudostigmatic organs long, filiform, with lateral branches. Dorsal abdominal setae less than 22, pectinate, all similar in size and structure.

Type species: Trombicula desdentata Boshell and Kerr.

The name of this genus is derived from *Crot* (*o*), a tick+*isc* (*us*), a diminutive. It is most nearly related to *Trombicula* Berlese, *sensu stricto*, from which it differs in having the palpal claw simple and the number of dorsal setae less than 22.

Whartonia, new genus.

Characters of larvae: Each chelicera obliquely flattened at distal end forming a "spearhead" with teeth on its margins. Palpal claw with 3 to 4 prongs; palpal setae all simple. Eyes present. Dorsal plate subrectangular, without an anterior median process; with a pair of submedian setae somewhat posterior to its anterior margin and situated on a low, allantoid tubercle. All setae on dorsal plate simple, including the pseudostigmatic organs. Dorsal setae of abdomen simple, many, most of them arranged in 4 transverse rows. Middle tarsal claw almost as stout as outer claws.

Type species: Hannemania nudosetosa Wharton.

This genus is named after Lieutenant (j. g.) G. W. Wharton, of the United States Naval Reserve, who described the type species. Lieutenant Wharton is now with Naval Medical Research Unit No. 2 in the South Pacific. *Whartonia* is most nearly related to the genus *Hannemania* Oudemans from which it is derived. It differs from Oudemans's genus in having all the body setae simple and the anterior submedian setae of the dorsal plate situated on an allantoid tubercle.

Heaslipia, new name.

The generic name *Trombiculoides* Womersley and Heaslip, 1943, is found to be preoccupied by *Trombiculoides* Jacot, 1938. The name *Heaslipia* is given to it in honor of one of the authors of *Trombiculoides*, W. G. Heaslip, who has made extensive contributions to our knowledge of tsutsugamushi fever and the trombiculid mites in Australia.

Gater's Identification of *Trombicula akamushi* (Brumpt) from the Federated Malay States.

Womersley and Heaslip (1943) have questioned Gater's identification of *Trombicula akamushi* (Brumpt) from Selangor, Federated Malay States. Their justification for such action was based upon the examination of material received from Dr. Takenouchi of the University of Tokyo. This material, however, was not a part of that examined by Gater. They state that because of their study of this material received from Dr. Takenouchi "we are able to satisfy ourselves that the specimens from the Federated Malay States do not agree with the Japanese material . . ." And they add the further statement, "in all probability the Japanese species does not occur other than in Japan and Formosa." This statement is very interesting to the writer since he checked the identifications made by Gater. However, since the identification has been questioned, I have reexamined the five Malay specimens given to the United States National Museum by Gater. They bear the following data, "from *Rattus r. falorensis* (Bonh.), Elmina, 5:3:29," and agree in all essential characters with specimens of *akamushi* from Japan. It was found, however, that there is a considerable individual variation among these specimens, taken from a single host and at one time, in regard to the relative length of the setae of the dorsal plate. This is of special significance since the differences in length of these setae was an important point for the characterization of *akamushi* by Womersley and Heaslip. In one of the specimens the anterior median seta is longer than both the anterior lateral setae and the posterior lateral setae. In another specimen the anterior median seta is longer than the anterior lateral but shorter than the posterior lateral. Yet in still another specimen the anterior median is shorter than both the anterior lateral and the posterior lateral.

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PROCEEDINGS
OF THE
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A NEW ELAPID SNAKE OF THE GENUS *MATICORA*
FROM SARAWAK, BORNEO

BY ARTHUR LOVERIDGE.

The long-glanded snakes, formerly referred to *Doliophis* Girard by Boulenger (1896, Cat. Snakes Brit. Mus., 3, pp. 399-405) are much in need of a thorough revision. The frontal character by which Boulenger endeavored to separate *bilineata* (Peters) from *intestinalis* (Laurenti), does not hold good, though on color pattern *bilineata* remains recognizable as a Philippine race of *intestinalis*.

This leaves us with three species of which *M. philippinus* (Günther) is distinguishable by its smaller eye, the other two appear to have several recognizable races. *M. bivirgata* and its forms are all immaculate underneath, and have from 34-50 subcaudals. *M. intestinalis* and its forms have the underside conspicuously barred with black, and have from 15-33 subcaudals.

However in the Museum of Comparative Zoology is a Sarawak snake which occupies an annectant position, having an immaculate abdomen and 23 subcaudals. Its occurrence in Sarawak where both *M. b. tetraetania* (Bleeker) and *M. i. nigrotaeniata* (Peters) are found, may have special significance, so, as its affinities are clearly with *M. intestinalis*, I propose calling it:

Maticora intestinalis immaculata, subsp. nov.

Type.—Museum of Comparative Zoology, No. 15,173. A male from near Marudi, Baram River, Sarawak, Borneo. Collected by Dr. H. W. Smith, December, 1920.

Diagnosis.—Differs from all other *intestinalis* in having the under-surface immaculate brick red (white in alcohol) except for the anal shield, otherwise without trace of black crossbars. Subcaudals 23.

Description.—Characters those of the typical form. Upper labials 6, the third and fourth entering the orbit; preocular 1; postoculars 2; temporals 1+2; ventrals 203; anal entire; subcaudals 23.

Color in life.—Above, dark brown with two longitudinal, dorsolateral,

yellow lines (pinkish brown in alcohol) two scales in width, another, but narrower, line on outermost row of scales on either flank; three light (? yellow in life) blotches on tail. Below, brick red (white in alcohol), uniform, except for anal shield which is black.

Size.—Total length of holotype ♂, 378 (347+31) mm.

* * * * *

There are eight species or subspecies of *Maticora* in the collection of the Museum of Comparative Zoology which can be separated by the following key. It cannot be too strongly emphasized, however, that other material, and all records in the literature, should be examined in order to ascertain whether the alleged races are associated with particular habitats, and for the purpose of defining their exact ranges.

Key to the Races of Maticora

1. Belly crimson or yellow (white in alcohol) with numerous black crossbars..... 2
 Belly uniform crimson (white) without trace of black crossbars. . . 6
2. Diameter of eye about half as long as its distance from the mouth; range: Philippines *philippina*
 Diameter of eye nearly equal to its distance from the mouth. 3
3. A single yellow (white) vertebral line in addition to a line (at least indicated) on either flank; range: Malaya; Borneo; Sumatra; Java; Celebes..... *i. bilineata*
 A pair of light lines on back in addition to a line (at least indicated) on either flank..... 4
4. A pair of pale gray lines on back; range: Mount Kinabalu, North Borneo..... *i. everetti*
 A pair of yellow or reddish brown lines on back. 5
5. Dark pigmentation of back extends forwards to end in a T-shaped marking connecting the eyes, and in sharp contrast to the red (white) snout; range: Philippines *i. bilineata*
 Dark pigmentation of back not forming a T-shaped marking on upper surface of head which is more or less uniform; range: Sarawak; Sumatra (? Celebes, if *sumatranus* is a synonym) *i. nigrotaeniata*
6. Subcaudals in 23-? pairs; range: Baram River, Sarawak (known only from holotype)..... *i. immaculata*
 Subcaudals in 34-50 pairs..... 7
7. Two fine pale-blue lines on back in addition to one, which may be white on either flank; range: Borneo..... *b. tetrataenia*
 No lines on back and none, or at most one, on either flank; range: Sumatra; Java and adjacent islands *b. bivirgata*

PROCEEDINGS
OF THE
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NOTES ON FISHES IN THE ZOOLOGICAL MUSEUM
OF STANFORD UNIVERSITY.

XV.—TWO NEW MINUTE GOBIES OF THE GENUS
MISTICHTHYS, FROM THE PHILIPPINES.

BY ALBERT W. C. T. HERRE.

From the Coromandel coast of India to the Philippines occur a number of translucent or practically transparent gobies. Some of them are the smallest living vertebrates, with adult males from 7.5 to 11 mm. in length, and adult females from 9.5 to 14 mm. Some of them occur in fresh water lakes, on the island of Luzon, while the rest are found in either brackish or salt water, or both, in lagoons, esteros, river mouths, and nipa and mangrove swamps. Because of their minute size and practical invisibility in life, most of them are little known, or are entirely overlooked by fishermen, collectors, and students.

The proper generic allocation of some of these gobies is very difficult. Aurich has lumped them all under the genus *Gobiopterus* Bleeker. This is the easiest way to dispose of them, but brings together divergent species, so that the genus becomes a heterogeneous assemblage of species with little in common but their size. Aurich is however perfectly correct in removing *Gobiopterus* from Kouman's subfamily Sicydiaphinae. Koumans recognizes *Mistichthys*, but says that my *Mirogobius stellatus* is the same as *Gobiopterus brachypterus* Bleeker. Since the last named has 25 scales, to select but one distinctive character, while the two species of *Mirogobius* described by me from Luzon are naked, Koumans seems to have a very elastic idea of a species. *Mirogobius lacustris* is entirely naked; *Mirogobius stellatus* is also naked, except that occasionally old males may have 2 to several scales at the caudal base. Sometimes specimens of *Mirogobius* seem to have scales, but examination with a compound microscope shows that none are present, the skin being merely striated. Koumans would not have lumped these species if he had made a careful examination of them. It is not enough to look at fishes,

without removing them from the bottle. With these tiny fishes the use of a compound microscope is essential.

KEY TO GENERA OF MINUTE GOBIES OF THE ORIENTAL TROPICS

A.—First dorsal very low, of three spines.....*MISTICHTHYS*

AA.—First dorsal higher, of 4 to 6 spines.

B.—, Anal I-8-13.

C.—25 to 27 scales in lateral series.....*GOBIOPTERUS*

CC.—Body naked, or at most with a very few scales at caudal base.....*MIROGOBIUS*

BB.—Anal I-5.....*PANDAKA*

Mistichthys panayensis Herre, new species.

Dorsal III-I-6; anal I-9; pectoral 13. Scales in lateral series 24-26, usually 24; transverse series 6; no predorsal scales. Females have the tongue emarginate, but little or not at all emarginate in males.

Depth in adults 4.6 to 4.7, the head and caudal equal, 3.8 to 4 times in the length. Form thickset, the dorsal profile gently arched; gravid females much distended laterally, their depth scarcely more than in males. Head broad, blunt, the short snout about half an eye diameter. The large mouth is more nearly vertical than in the other minute oriental gobies, the posterior angle of the maxillary not reaching a vertical from the front margin of the eye; by exception old males may have it reaching that far. Chin broad, prominent, ending the dorsal profile; males with heavier lower jaw and more prominent chin than females. Adult males with a row of long pointed teeth in upper jaw; lower jaw with an anterior row of 6 or 8 widely spaced broad caniniform teeth, often curved or hooked; behind them a pair of post-symphysal canines and an inner row of long slender pointed teeth on each side, extending forward as far as the last teeth of the outer row. Females have a single row of small pointed teeth in the upper jaw, which become needle-like with age, the anterior ones slightly hooked; sometimes there are 2 irregular rows at the front of the jaw; the lower jaw is more or less irregularly two-rowed, the teeth becoming stouter than above, with a pair of very small post-symphysal canines.

The large eye is 2.8 to 3 times in the head; the distance from its hind margin to the snout tip is less than the postorbital region. The broad interorbital equals or is greater than the eye. The dorsals are well separated, the first dorsal low, about 2.5 times in the head, the 3 spines about equal in height; the second dorsal and anal are similar, their anterior rays longest; second dorsal height about 1.3, the anal height about 1.25 times in the head, both fins falling far short of the caudal when depressed. The elongate pointed pectoral extends to a point above the anus, rarely over the anal papilla; the small ventrals form a narrow funnel, almost tubular, and seldom, if ever, reach more than half way to the anus; the caudal is more or less rounded, the central rays longest. The female genital papilla is thick and bluntly rounded, the male one very slender and pointed; they scarcely equal, or are less than the

diameter of the pupil. The isthmus is rather broad; the gill openings do not extend forward, but the membranes are so easily torn that they sometimes seem to do so.

In life these little fish are transparent, the only coloring being the black eyes. In preservative the color of adult males is grayish white, with stellate melanophores more or less densely sprinkled on the chin, upper lip, interorbital space, sides of the head, and on the pectoral and ventral bases; a black line from the angle of the opercle to the caudal base; a double row of melanophores from the head along the back to the caudal; another row from the pectoral axil to the anal origin and along the anal base to the caudal; additional small melanophores sprinkled on the sides; the fins are colorless. Adult females are similar in coloration but with fewer and usually paler melanophores, except on the sides of the abdomen and along the dorsal origin.

Described from the types, a female 12 mm. long, and a male 11 mm. long, 103 female paratypes 8.5 to 12.5 mm. in length, and 73 male paratypes 9 to 11.5 mm. in length. I collected them from a salt water nipa swamp near Capiz, Capiz Province, Panay, Philippine Islands.

From the succeeding species this one differs markedly in form, physiognomy, and coloration.

Mistichthys mindanensis Herre, new species.

Dorsal III- I-6 or 7; anal I-9 to 12, usually 9 or 10; pectoral 14; scales in longitudinal series 24; scales from second dorsal origin to that of anal, 6; no predorsal scales. The second dorsal origin is behind that of the anal and opposite the base of the first or second branched anal ray. In all related species of this and other genera the second dorsal and anal origins are either opposite or the second dorsal is slightly in advance of the anal.

Males have the dorsal profile of the slender elongate body slightly convex, the ventral profile nearly straight; gravid females have the dorsal profile gently convex to more or less humped, the abdomen strongly distended laterally and downward. The head is large, blunt, broader than the trunk except in females about to spawn, usually 3.5 times in the length, but in females contained up to 3.9 times. The depth in males is 5 to 5.8 times, in spawning females 4 to 4.25 in the length. The rounded caudal is 3.5 to 4, the pointed pectoral 4.2 to 4.6 in the length. The large eye is in the anterior part of the head, in which it goes 2.7 to 3 times; the nearly flat interorbital equals the eye in females but is narrower in males; the very short snout is 2.5 times in the eye. The mouth is strongly oblique, the lower jaw prominent, its tip forming part of the dorsal profile; in females the angle of the maxillary may reach a vertical from the front margin of the eye, or be a little more or less than this; males have the mouth more nearly vertical, the maxillary angle usually not extending beneath the front margin of the eye, and never beyond it in the specimens examined.

Males have an outer row of 6 large caniniform teeth, three on each side, at the front of the lower jaw, the second tooth on each side largest;

behind these is a pair of very small symphysial canines, and a long inner row of minute teeth clear around the jaw; in the upper jaw is an outer row of 6 or 7 moderately large teeth on each side (12 or 14 in all), with a long row of excessively fine teeth behind it. Females have a row of 16 to 20 small teeth in the upper jaw; in the lower jaw an outer row of 20 to 30 teeth and an inner row of very minute teeth extending from far back on the jaw almost to the symphysis. In both sexes the tip of the tongue varies from slightly rounded or nearly truncate to moderately bilobed.

The low first dorsal extends but little more than half way to the second dorsal when depressed, separated from it by 2 or 3 scales, its longest spine equal to or a trifle longer than the eye; the second dorsal height is 8 times in the length in females, 5.5 to 5.8 in males; the anal height is 6.6 to 7 times in the length; the second dorsal and anal fall far short of the caudal when depressed. The ventrals form a very narrow elongate tube, not like the ordinary goby ventrals, 8 to 8.75 in the length in females, but noticeably longer in males, 6.6 to 7 times in the length. The least depth of the caudal peduncle is twice in its own length. The length of the thick, bluntly rounded genital papilla of females scarcely equals the diameter of the pupil; the very slender pointed male papilla is less than a pupil diameter.

Gravid females contain about 50 large eggs which are polyhedral while in the ovaries, but become circular or nearly so when released, .3 to .4 mm. in diameter. On one side are many villi or short filaments, with a tuft of longer filaments at the micropyle. These filaments are much shorter than those shown by Dr. Lois TeWinkel in her paper on *Mistichthys luzonensis*, and are less than an egg diameter in length.

The color in alcohol is dull neutral gray, with a fine black line from beneath the pectoral to the middle of the caudal base; a row of brown dots on top of the head and along the median dorsal area, and a row of black dots from the under side of the head and beside the anal base to the caudal; the fins are all colorless. In life this fish is practically transparent, and in the paler preserved specimens the brain is perfectly visible.

Described from a type female 10.5 mm. long and 26 other females 9.5 to 13 mm. in length; all are about ready to spawn except several about 10 mm. long which have already spawned; a type male 10.5 mm. long, and 8 other males 9.5 to 10.5 mm. long, and one juvenile male of 8.5 mm., which is the only specimen not sexually mature. They were collected from salt water puddles around the base of nipa palms near the Fisheries Station at Zamboanga, Mindanao.

KEY TO THE SPECIES OF MISTICHTHYS

A.—Confined to fresh water—Lake Buhi, Luzon. . . *M. LUZONENSIS*
AA.—Living in salt water swamps

B.—Anal not in advance of second dorsal; many stellate melanophores on head and body. . . *M. PANAYENSIS*

BB.—Anal in advance of second dorsal; no black stellate melanophores; a few brown dots above and a row of black dots on under side. *M. MINDANENSIS*

Aurich gives *Gobiopterus luzonensis batonensis* Bunag, from Lake Bato. This is a large shallow lake, 250 or 300 feet lower than Lake Buhi, and receives the outlet of the latter lake. This stream is swift and full of rapids. Aurich gives no description, but from his figure *batonensis* seems to be an entirely different fish from *luzonensis*, not even a member of the same genus.

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PROCEEDINGS
OF THE
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TWO MILLIPEDS FROM SOUTHERN CALIFORNIA.

BY RALPH V. CHAMBERLIN

The two new millipeds here described are represented in material sent to me for identification by Dr. Robert C. Stebbins of the University of California at Los Angeles.

Tylobolus stebbinsi, new species.

The type is light brown with darker annuli about the metazonites. Legs yellowish brown. Collum and anal segment clear light brown.

Head smooth and shining; longitudinal median sulcus across vertex and ending at lower margin distinct except for the usual interruption at level of antennae. Setigerous clypeal foveolae 5-5. Antennae cylindrical, not clavate. Eyes composed of about 36 ocelli arranged in 6 subvertical, slightly curved series; e. g., 7, 7, 7, 7, 5, 3.

Collum and second tergite in male of usual form.

Claws of first two pairs of legs in the male but little larger than those of the third pair. Coxae of second legs simply swollen. Coxae of third legs with a subuncate process, the rounded apex of which is directed forward, the process compressed to an edge on caudal side, as usual. Coxae of fourth, fifth and sixth legs compressed, produced ventrad into low rounded prominences, these decreasing from fourth to sixth.

Gonopods present the features by which the species is best distinguished. For these see figs. 4 and 5.

Number of segments in male holotype, 43.

Diameter, 6 mm.; length, about 57 mm.

Locality, California: Santa Monica Mountains, Meadow Canyon. Male holotype taken March 4, 1944, by R. C. Stebbins.

Distinguished readily from *T. deses*, in the details of the posterior gonopods and the better development of coxal processes on legs behind the third pair, etc.

Motyxia monica, new species.

The type at present is apparently not in color, being pale and showing but little indication of pigment.

The form of the keels on anterior, middle and posterior segments is shown in figs. 1 and 2.

This species is readily distinguished from the generotype in the form of the gonopods of the male. In these the mesal inferior prong is slender and conspicuously curved, with the tips bent proximad; and the upper or major branch bears apically a characteristic spur, as shown in fig. 3. In *M. kerna*, the only other species known at present, the mesal prong is erect and the major prong bears no apical spur.

Width of male, 5 mm.

Locality, California: Santa Monica Mountains. One male taken in Meadow Canyon, March 4, 1944, by R. C. Stebbins.

***Motyxia monica*, new species.**

Fig. 1. Right keels in outline, segments I to IV and part of V.

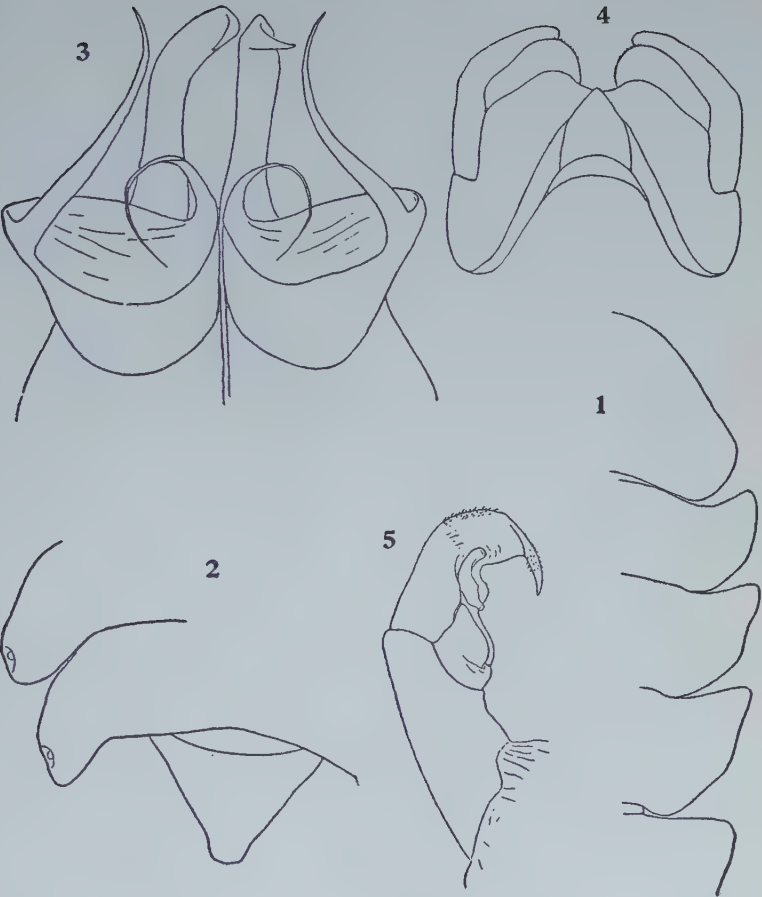
Fig. 2. Caudal end, dorsal view, in outline, showing anal tergite and left keels of two preceding segments.

Fig. 3. Gonopods of the male, ventral view.

***Tylobolus stebbinsi*, new species.**

Fig. 4. Gonopods of male, anterior view.

Fig. 5. Right posterior gonopod of male, caudal view.



PROCEEDINGS
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THREE NEW SPECIES OF AUSTRALASIAN AEDES
(DIPTERA, CULICIDAE)¹

D. S. FARNER, LIEUTENANT (JG), H-V(S), USNR ² AND
R. M. BOHART, LIEUTENANT (JG), H-V(S), USNR ³

Because of the importance of *Aedes pseudoscutellaris* (Theobald), and perhaps other closely related forms, in the transmission of nonperiodic filariasis, it has been necessary to devote considerable attention to determining the geographic distribution of these species. In the course of this investigation, three new species were discovered, all of which had been referred previously to other species in this group.

Aedes (Stegomyia) *guamensis*, new species.

Stegomyia scutellaris (Walker), Fullaway 1912, Ann. Rep. Guam Agric. Exp. Sta. for 1911, p. 33.

Aedes pseudoscutellaris (Theobald), Swezey 1942, Bul. Bernice P. Bishop Mus. 172: 199.

Aedes scutellaris pseudoscutellaris (Theobald), Knight, Bohart, and Bohart 1944 (in part), Keys to the Mosquitoes of the Australasian Region (Nat. Res. Council, Washington), p. 55.

Male.—Length about 3 mm., wing about 2.0 mm. Vertex covered with broad appressed scales with median broad V-shaped white mark and two lateral white spots. Torus with broad inner patch of white scales. Clypeus bare. Proboscis dark; palpus about length of proboscis, segments with basal white patches. Anterior pronotal lobe with many white broad appressed scales; posterior pronotum with dark narrow curved scales and a patch of white broad scales opposite anterior pronotal lobe. Scutum with median white stripe narrowing posteriorly and forked in the

¹ The authors wish to thank Dr. Alan Stone, Division of Insect Identification, U. S. Department of Agriculture, for his helpful suggestions and assistance.

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³ U. S. Naval Medical Research Unit No. 2.

prescutellar area, with an indistinct short posterior submedian line of white scales, and a patch of white broad scales over the wing base. Scutellum with white broad appressed scales on all three lobes, a few dark appressed scales at apex of mid lobe. Pleuron with white scales arranged more or less in two parallel lines and scattered spots. Coxae with patches of white scales; inner surface of femora with broad pale longitudinal stripe interrupted subapically on hind leg; each femur with a white knee spot; tibiae with dark scales; front tarsus dark; segments I and II of mid tarsus with indistinct pale basal patches; hind tarsus with inner dark line extending its entire length, interrupting all white bands; length of white band on segment I $\frac{1}{5}$ length of segment; width of basal white band on II about $\frac{1}{4}$ length of segment; width of basal white band on segment III $\frac{1}{5}$ to $\frac{1}{2}$ length of segment; width of basal white band on segment IV $\frac{3}{5}$ to $\frac{3}{4}$ length of segment; segment V entirely white except for inner dark line. Wing with dark scales. Abdominal tergites II to VII with basal to subbasal lateral white spots; tergite VIII with lateral basal spots or a basal band; sternites II to VI mostly pale; last two sternites with apical dark bands. Genitalia with basal lobe of basistyle as in figures 5 and 6; dististyle long curved and somewhat swollen subapically.

Female.—Markings about as in male. Palpus about $\frac{1}{5}$ length of proboscis, apical segment mostly white. Tarsi as in male except segments I and II of front tarsus often also with indistinct basal patches. Sternites II to VII pale, last two sternites with apical dark bands.

Type.—Male (U. S. National Museum No. 57180), Mata, Guam, November 18, 1944 (R. G. Oakley).

Paratypes.—26 ♂♂, 19 ♀♀, various localities on Guam (R. G. Oakley, 1937–1938; A. Cruz, November 1937; D. T. Fullaway, 1911), U. S. National Museum. Many of the specimens are recorded as reared from coconut husks, caracao wallows, and a water drum.

This species differs from all other known species of the subgenus *Stegomyia* with the thoracic marking described above, in having *interrupted* white basal bands on the segments of the hind tarsus. The tarsi when viewed on the inner side appear entirely dark but when viewed from the outer side have the appearance of those of *pseudoscutellaris* and related forms. The basal lobe of the basistyle of *guamensis* resembles most closely that of *pseudoscutellaris*, but has a different shape (compare figures 2, 3, and 5, 6). Furthermore, the thickened bristles of the basal lobe in *guamensis* are less developed than those in *pseudoscutellaris*. In addition to the type series, more than 100 specimens (♂♂ and ♀♀) from Guam have been examined.

Aedes (*Stegomyia*) *pernotatus*, new species.

Aedes scutellaris hebrideus Edwards, Daggy 1944, War Med., 5:292.

Male.—Length about 3 mm., wing about 2 mm. Vertex covered with broad appressed scales with median broad V-shaped white mark and two lateral white spots. Torus with broad inner patch of white scales. Clypeus bare. Proboscis dark with indistinct pale ventral line; palpus

slightly shorter than proboscis, segments with basal white patches. Anterior pronotal lobe with many white broad appressed scales; posterior pronotum with dark narrow curved scales and a patch of white scales opposite anterior pronotal lobe. Scutum with narrow median white stripe narrowing posteriorly and forked in the prescutellar area, with an indistinct short posterior submedian line of white scales, and a patch of broad white scales over the wing base. Scutellum with white broad appressed scales on all three lobes, a few dark appressed scales at apex of mid lobe. Pleuron with white scales arranged more or less in two white parallel lines and scattered spots. Coxae with patches of white scales; inner surface of femora with broad pale longitudinal stripe interrupted subapically on hind leg; each femur with a white knee spot; tibiae with dark scales; segments I, II, and III of front and mid tarsi with basal white patches, occasionally lacking on III; frequently such patches discernible on IV and V; white bands of segments I and II of hind tarsus $\frac{1}{4}$ to $\frac{1}{3}$ length of segment, that of I interrupted by an inner line of dark scales; segment III with basal white band covering about $\frac{1}{2}$ of segment; segment IV with basal white band covering $\frac{3}{4}$ of segment; segment V entirely white. Wing with dark scales. Abdominal tergites II to VII with basal to subbasal lateral white spots; tergite VIII with lateral basal spots or a basal band; sternites II to VIII with basal to subbasal white bands. Genitalia with basal lobe of basistyle as in figure 4; dististyle long curved and somewhat swollen subapically.

Female.—Markings about as in male. Palpus about $\frac{1}{6}$ length of proboscis, apical segment mostly white.

Type.—Male (U. S. National Museum No. 57178), Second Channel Area, Espiritu Santo, New Hebrides, August 15, 1943 (K. L. Knight).

Paratypes.—6 ♂♂, 11 ♀♀, Turtle Bay and Second Channel Area, Espiritu Santo, September, 1943 (K. L. Knight), U. S. National Museum. Many specimens are recorded as reared from tree holes and various artificial collections of water.

Most specimens of *pernotatus* can be distinguished from *pseudoscutellaris* by the presence in the former of basal white patches on segment III (sometimes also on IV and V) of the mid, or front and mid legs (usually more distinct in female). Males without these markings can be distinguished from *pseudoscutellaris* by differences in genitalia (figures 2, 3 and 4). The small percentage of females without the tarsal markings as described above are apparently morphologically indistinguishable from the Polynesian *pseudoscutellaris*. The only known species which has tarsal markings similar to those of *pernotatus* is *quasiscutellaris* which occasionally has a few pale scales basally on segment III of mid or front tarsus. However, this species has complete longitudinal bands on the abdominal tergites whereas *pernotatus* has only lateral basal patches.

The male genitalia appear to place *pernotatus* closest to *hebrideus* Edwards in that both have a few enlarged bristles on basal lobe of the basistyle. However, the basal lobes in these species are distinctly different in shape (figures 4, 7 and 8).

In addition to the type material, the following specimens have been examined: 1 ♂ and 5 ♀♀, various localities on Espiritu Santo (K. L. Knight); 2 ♂♂ and 3 ♀♀, Vila Area, Efate (K. L. Knight).

Aedes (*Stegomyia*) *quasiscutellaris*, new species.

Aedes variegatus (Doleschall), Edwards 1926, Bul. Ent. Res. 17:101; and other authors.

Aedes (*Stegomyia*) *scutellaris* (Walker), Edwards 1932, Genera Insectorum, fasc. 194: 165; and other authors.

Male.—Length about 3.0 mm., wing about 2.0 mm. Vertex covered with broad appressed scales with median broad V-shaped white mark and two lateral white spots. Torus with broad inner patch of white scales. Clypeus bare. Proboscis dark with an indistinct pale ventral line; palpus slightly shorter than proboscis, segments with basal white patches. Anterior pronotal lobe with many white broad appressed scales; posterior pronotum with dark narrow curved scales and a patch of white broad scales opposite anterior pronotal lobe. Scutum with narrow median white stripe narrowing posteriorly and forked in the prescutellar area, with an indistinct short posterior submedian line of white scales, and a patch of white broad scales over the wing base. Scutellum with white broad appressed scales on all three lobes, a few dark appressed scales at apex of mid lobe. Pleuron with white scales arranged more or less in two parallel lines and scattered spots. Coxae with patches of white scales; inner surface of femora with broad pale longitudinal stripe interrupted subapically on hind leg; each femur with a white knee spot; tibiae with dark scales; segments I and II of front and mid tarsi each with basal white patch, occasionally a few pale scales at base of III; hind tarsus with white bands of segments I and II $\frac{1}{4}$ to $\frac{1}{3}$ length of segment, that of I interrupted by an inner line of dark scales; segment III with basal white band covering about half of segment; segment IV with basal white band covering $\frac{3}{4}$ of segment; segment V entirely white. Wing with dark scales. Abdominal tergites II to VII with narrow subbasal white lines broadened and more basal laterally, those on tergites II and VII often interrupted medially; tergite VIII with a broad basal band; sternites II +o VI with basal to subbasal white patches or bands, sternite VIII with an interrupted median band. Genitalia with basal lobe of basistyle as in figure 1; dististyle long, curved and somewhat swollen subapically.

Female.—Markings about as in male. Palpus about $\frac{1}{2}$ length of proboscis, apical segment mostly white. There is a greater tendency towards interruption of the band on abdominal tergite II.

Type.—Male (U. S. National Museum No. 57179), Guadalcanal, Solomon Islands, 1944 (J. N. Belkin).

Paratypes.—34 ♂♂, 35 ♀♀ same data as type, U. S. National Museum.

Specimens from Tulagi and Gela in the Solomons belonging to this species have been described previously by Edwards (Bul. Ent. Res., 17: 101, 1926) who provisionally regarded them as representing the typical form of *Aedes variegatus* (Doleschall) which had been described from Amboina in 1858. However, *variegatus* Doleschall is a homonym and Edwards (Gen. Insec., fasc. 194: 165, 1932) referred this material to

scutellaris Walker which had been described from the Aroe Islands in 1859. Examination of a considerable number of collections from eastern New Guinea, the Solomons, and the New Hebrides leads to the conclusion that *quasiscutellaris* has a restricted distribution and does not occur on New Guinea. All mosquitoes of the *scutellaris* group from New Guinea examined by the authors are referable to *hebrideus* Edwards. Therefore, there seems to be no reason to accept Edwards' "provisional" designation of the Solomon Islands form as *scutellaris*.

In addition to the type material the following specimens have been examined: Guadalcanal, 117 ♀♀ and 101 ♂♂, collected by A. Weathersby, F. Lechner, K. L. Knight, P. W. Oman, J. N. Belkin, A. B. Gurney, J. R. Douglas; Bougainville, 26 ♂♂ and 40 ♀♀, collected by A. B. Gurney, A. Weathersby, F. Lechner, C. R. Bruck; Treasury Island (Solomons), 6 ♂♂ and 12 ♀♀, collected by J. H. Paullus.

EXPLANATION OF PLATE VI.

Basal lobes of basistyle.

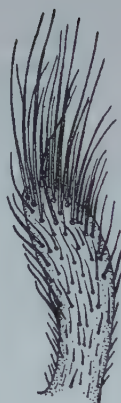
Fig. 1, *quasiscutellaris* n. sp. (ventral view); Fig. 2, *pseudoscutellaris* (Theobald) (ventral view); Fig. 3, *pseudoscutellaris* (dorsal view in another specimen); Fig. 4, *pernotatus* n. sp. (ventral view); Fig. 5, *guamensis* n. sp. (ventral view); Fig. 6, *guamensis* (lateral flattened view); Fig. 7, *hebrideus* Edwards (ventral view); Fig. 8, *hebrideus* (lateral view).



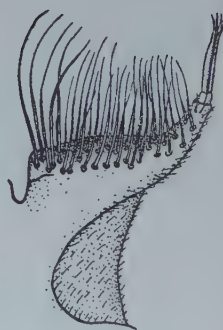
1. *quoscutellaris*



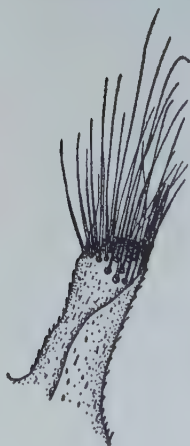
2. *pseudoscutellaris*



3. *pseudoscutellaris*



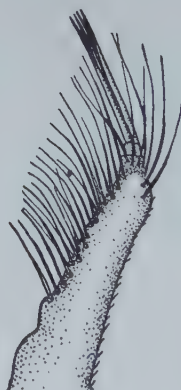
4. *pernotatus*



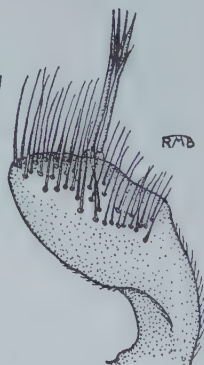
5. *guamensis*



6. *guamensis*



7. *hebrideus*



8. *hebrideus*

PROCEEDINGS
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GENERAL NOTES.

EUMECES ANTHRACINUS (BAIRD) IN VIRGINIA.

At the time of the publication of Taylor's study of the genus *Eumeces* (1935, Univ. Kan. Sci. Bull., Vol. 23), there were no published records or museum specimens of *Eumeces anthracinus* from Virginia. There were two localities listed for Maryland, however, and several for North Carolina. Taylor's review of the recent literature on the genus in 1943 (Univ. Kan. Sci. Bull., Vol. 29, Pt. 2, No. 5) lists several new localities in the eastern states, including the first records for the species in Kentucky and Georgia.

The purpose of the present report is to call attention to the discovery of *E. anthracinus* in Virginia. On March 25, 1944, an adult specimen was collected at Clifton Forge, Alleghany County, at an elevation of 1090 feet. The skink was first seen crossing a dirt road and when disturbed it ran but a short distance, taking cover in a clump of plantains. In life this specimen had a greenish tinge, especially on the ventral surface. The gular suffusion was very reddish, the color extending onto the lower labials. It may be of interest to note that this skink has 6 upper labials and 28 scale rows.

In March, 1942, a juvenile of this species about 40-50 mm in total length was discovered under a stone on the top of Middle Mountain (Alleghany County, 3 miles north of Clifton Forge), at an elevation of 3000 feet. At the time of collecting the weather was cold and windy, although the sun was shining. This specimen, while kept in captivity, fed regularly upon earthworms. Under the stone where this lizard was found was a considerable amount of various insect debris, mostly wing sheaths of small beetles.

On June 26, 1944, an adult specimen was seen at the same place on Middle Mountain as was the juvenile taken in 1942. The day was clear and hot, and the skink was basking in the trail. It escaped through leaves and brush and disappeared into a crevice in the limestone ledges along the mountain top.

It seems that in the central part of its eastern range *anthracinus* is more

or less restricted to mountainous regions, and all the records listed by Taylor for the eastern states (with the exception of the Alabama "pluvialis" specimens) are all at least 1000 feet above sea level, most over 2000. Perhaps more collecting at higher altitudes in the Alleghany and Blue Ridge Mountains might dispel part of the supposed rarity of *E. anthracinus*.

I wish to express appreciation to Mr. J. A. Fowler, who has had the kindness to read the manuscript for this note and make helpful comments.

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NOTES ON *CNEMIDOPHORUS SEXLINEATUS* IN VIRGINIA.

Judging from previous locality records, chiefly those published by Burt (1931, Bull. U. S. Nat. Mus., 154: 91), it would seem that *Cnemidophorus sexlineatus* (Linnaeus) is a species restricted, on the Atlantic coast, to the Piedmont and Coastal Plain regions. In Virginia, North Carolina, South Carolina, and Georgia, *sexlineatus* appears to be indigenous to the Coastal Plain, occurring in the Piedmont only along rivers. In the eastern states considered most of the localities were at rather low altitudes, only a few being over 500 feet. Except for one North Carolina report (Black Mountain, Buncombe County), there have been no records of the species occurring in the Blue Ridge Province. Recently, however, *sexlineatus* has been found west of the Blue Ridge in the state of Virginia.

On May 19, 1944, two females were taken in a small hollow just north of Clifton Forge, Alleghany County. These lizards were found sunning in the road; when disturbed they attempted to take cover first by hiding in low vegetation, later by burrowing in the loose shale of a nearby hillside. On August 23, 1944, an adult was collected at Eagle Mountain, Botetourt County. It was seen on the tracks of the C. & O. Railroad, and attempted to avoid capture by hiding in the ballast under a rail. Several juveniles, one with a greenish tail, were seen at this locality. Another specimen was taken at Clifton Forge on September 17, 1944.

It is interesting to note that these specimens differ somewhat from the bulk of the *sexlineatus* population in having 3 supraoculars and in having the two outer parietals horizontally divided. Two of the specimens have 4 preanals, the others have 3. More specimens from western Virginia will be required before it can be determined whether or not a peculiar geographically isolated "local phase" population exists in the

mountains and is developing differentiated features by in-breeding. Without doubt *sexlineatus* arrived in the Alleghany Mountains by way of the James River Valley. The area west of the Blue Ridge drained by the James River is sufficiently isolated for the development of such a population.

Setting the altitude of about 1000 feet as the approximate maximum elevation for *sexlineatus* in Virginia, it may be expected that the species will be found to occur in Roanoke and Montgomery counties on the Roanoke River, and possibly in Scott, Washington, and Smyth counties in southwestern Virginia. These localities are on the headwaters of the Tennessee River and the low elevations are about 1200 feet. The species has not been found farther up the James River Valley than Clifton Forge, although it is fairly common there.

Possibly future collecting along the upper James River may reveal the presence of several species of reptiles previously considered to be restricted to eastern Virginia. Among these may be *Lampropeltis rhombomaculata* and *Pseudemys rubriventris*.

Dr. Charles E. Burt is due my thanks for reading the manuscript of this paper, which has profited from his suggestions.

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